Vol. XXIII SEPTEMBER 1929 No. 9

The EXCAVATING ENGINEER

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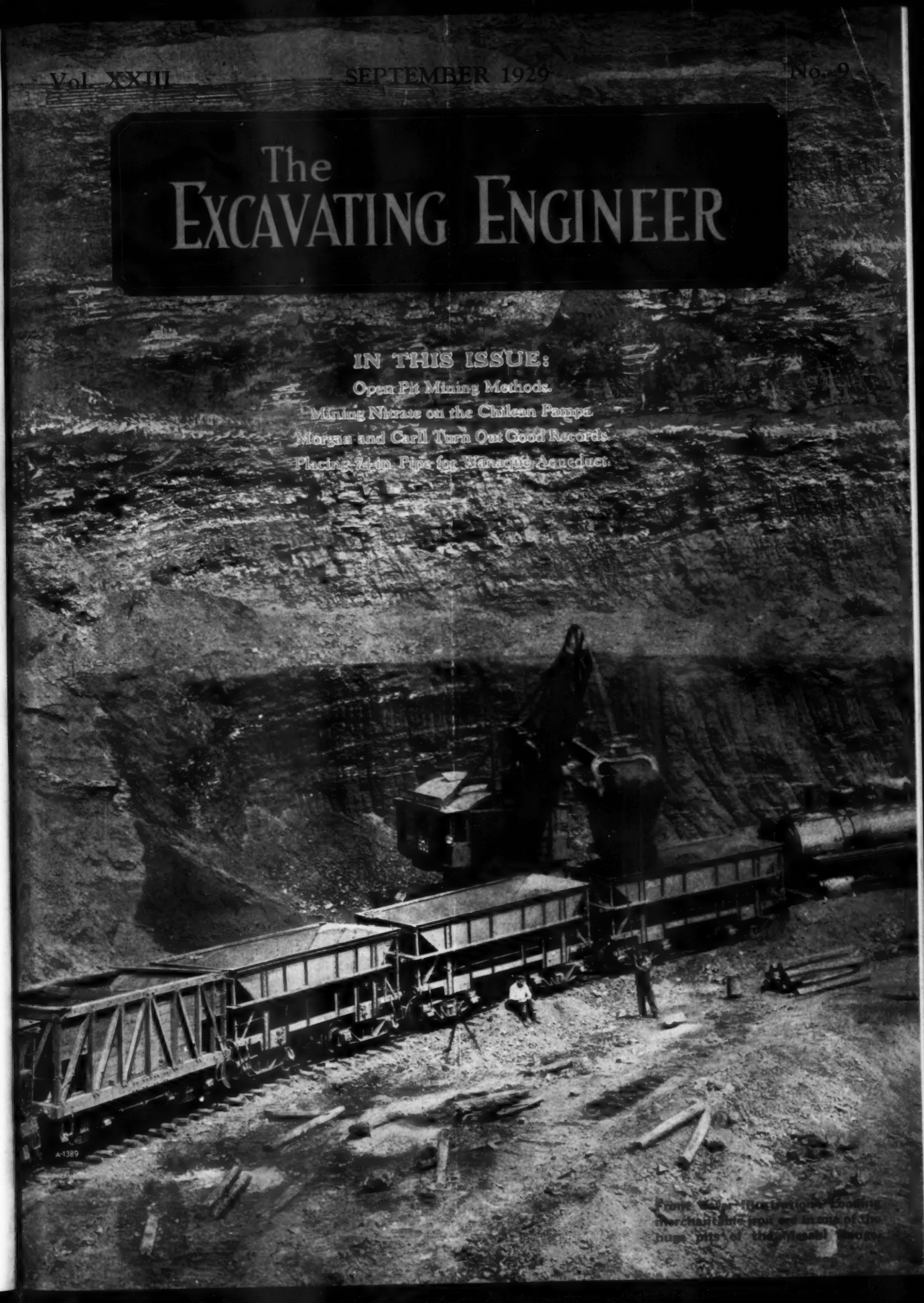
Open Pit Mining Methods.

Mining Nitrate on the Chilean Pampa

Morgan and Carll Turn Out Good Records

Placing 74-in. Pipe for Wenatchee Aqueduct



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flashed the user's story of the BUCYRUS-ERIE "1030"

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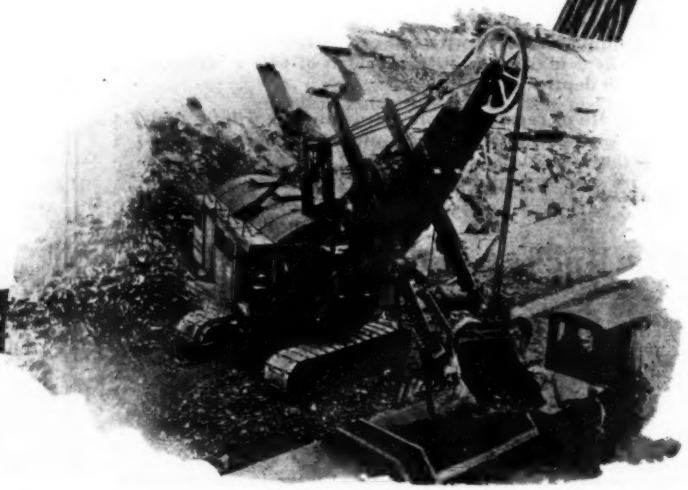

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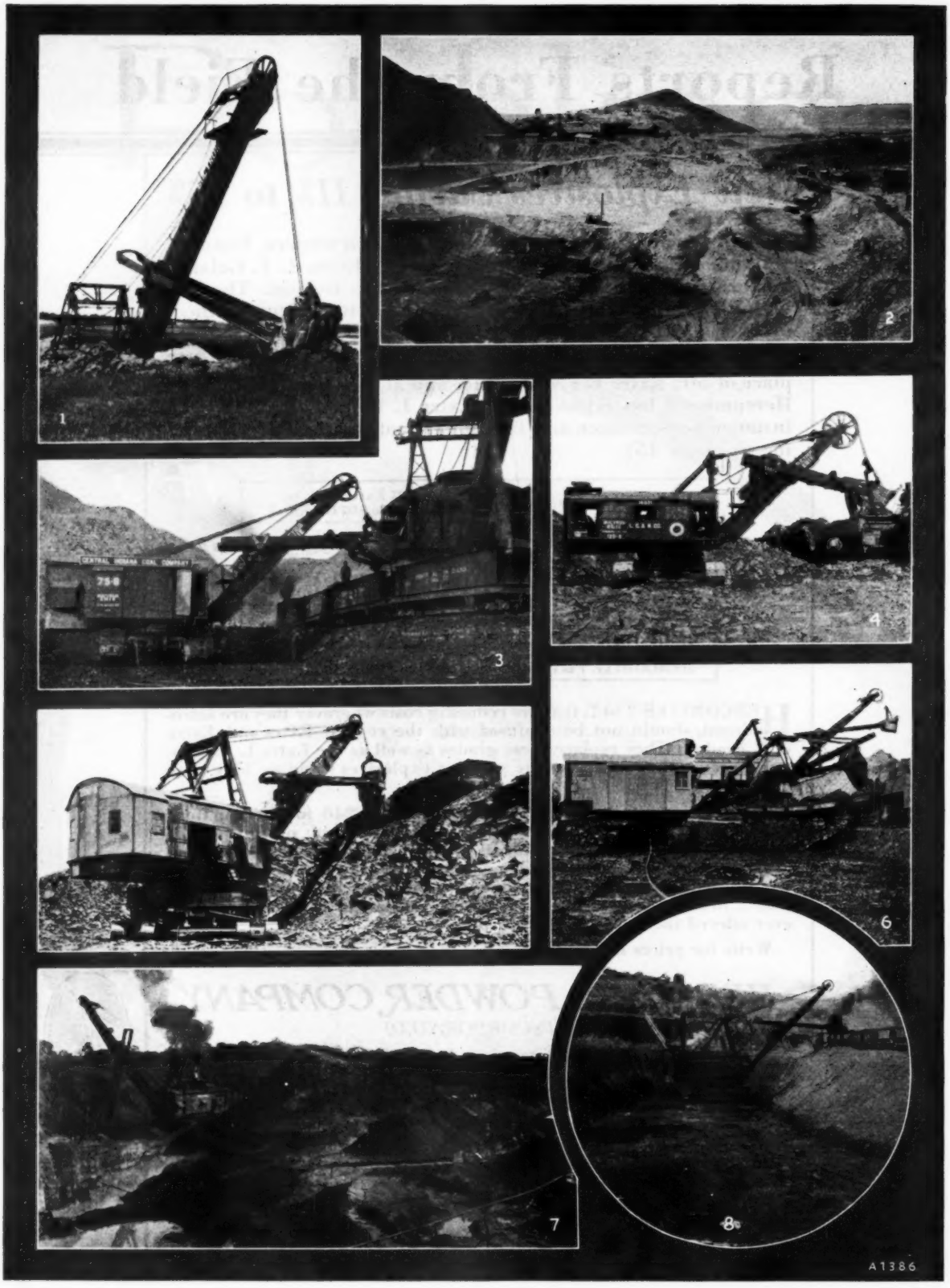

Typical Open Pit Mining Operations

See opposite page for captions.

The EXCAVATING ENGINEER

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Open Pit Mining Methods

◆ ◆ ◆

A summary of the Bureau of Mines report on methods, costs and safety in strip mining.

◆ ◆ ◆

Gypsum is mined by strip pit methods very similar to bituminous coal operations. Here is a 6-yard electric stripper on a Michigan gypsum ledge owned by the United States Gypsum Company.

THE popular conception of a mine is a maze of underground workings from which useful minerals are won at considerable depths below the surface of the earth. Open pit methods of mining, by which coal or ore is mined from the surface by the use of monster steam or electric shovels, has, however, been developed to a point where during an average year approximately 19,000,000 tons of bituminous coal, 24,000,000 tons of copper ore, 32,000,000 tons of iron ore, 160,000 tons of bauxite, and 2,700,000 tons of pebble phosphate are mined in the United States in this manner. These quantities total nearly 78,000,000 tons, and at least four times that amount of overburden is stripped to expose these minerals for mining.

The great power shovels used in the stripping operations range in dipper capacity from 3 to 16 cubic yards, weigh 125 to 850 tons, and may cost $100,000 or more. The increase in open-pit mining operations, with consequent demand for infor-

Typical Open Pit Mining Operations

1. Six-yard stripper removing overburden in mine of United States Gypsum Company. 2. In the open pit operations of the United Verde Copper Company four Bucyrus-Erie, two-yard, electric shovels load the ore to trucks. 3. Central Indiana Coal Company at their Allendale mine use an electric 3¼-yard coal loader and 12-yard electric stripper. 4. Lehigh Coal & Navigation Company use this husky 4-yard electric shovel for stripping tough blue and gray sandstone which is loaded into 30-yard cars. 5. Six-yard Bucyrus-Erie electric stripping oil-bearing shale overburden from coal mine in South Manchuria. 6. Horizontal-thrust coal-loaders have proven very successful in loading out thin seams of coal. Here we see a 50-B electric, horizontal-thrust coal-loader with an 8-yard, electric stripper in the background at a Pittsburg and Midway mine. 7. Shovels are rapidly replacing hydraulic methods and hand labor in stripping and mining of tin. Here is a Bucyrus-Erie 6-yard stripper in a Nigerian tin mine. 8. In the Hull Rust pit of the Oliver Iron Mining Company at Hibbing, Minnesota, claimed to be the largest open pit iron mine in the world, this Bucyrus-Erie 320-B is loading merchantable ore for shipment to the blast furnaces.

mation on methods and costs of stripping, has caused the United States Bureau of Mines, Department of Commerce, to conduct an investigation of the subject which is reported in Bureau of Mines Bulletin No. 298, entitled "Methods, Costs, and Safety in Stripping and Mining Coal, Copper Ore, Iron Ore, Bauxite, and Pebble Phosphate."

One of the recent developments in strip coal mining is the use of draglines to permit handling deep overburden. At the Gayle Coal Company operations at Du Quoin, Illinois, the overburden is 50 to 60 feet deep. A Bucyrus-Erie Class-24, 4-yard, electric dragline takes off the top 15 or 20 feet ahead of the Bucyrus-Erie 320-B electric which digs the remainder, including about 20 feet of very hard clay shale lying just above the coal. A 50-B Diesel dragline with 60-foot boom works on the spoil bank, pulling back the overburden as the 320-B casts it over. A 50-B electric follows, loading out the coal.

Stripping as a method of mining dates back to the early mining of coal, when overburden was removed by pick and shovel, loaded into wheelbarrows or carts, and dumped, according to F. E. Cash and M. W. von Bernewitz, who conducted the investigation. Some of the early wheelbarrow runs and dumps can yet be seen in the anthracite districts of Pennsylvania. When the overburden became too heavy to move by hand, horses with plows and slip scrapers were used; and later came wheeled scrapers for heavier work or thicker overburden.

Much of the development of the coal-stripping industry has taken place in the Danville district, Illinois, where small pits were opened in 1866. Pittsburg, Kansas, also was the scene of early coal-stripping operations. In 1897 the first steam shovel was introduced into the iron ranges of Minnesota. In 1906 stripping of copper ore with steam shovels was started at Bingham, Utah. At the present time the industry has grown until approximately twenty thousand men are employed in strip mining operations in the United States.

Strip Coal Mine Operations

Bituminous coal is stripped of its cover and mined in 20 states of the Union. The total production by stripping operations is growing, particularly in Indiana, Illinois, Missouri, Oklahoma, Montana, and North Dakota. This output is equal to about 3 per cent of the total coal produced in all states. The strip mines range in capacity from a few hundred to several thousand tons a day. The capital required to purchase and equip a strip mine is large. The land may cost $100 to $500 an acre; a 6 or 8-yard stripping shovel costs approximately $99,000 to $158,000 and a loading shovel $15,000 to $26,000; locomotives cost $6,000 and up; track costs $27 to $43 a ton (about $2,000 a mile); dump cars cost $400 and up; and a tipple may cost $3,000 to $130,000 depending on the amount of machinery installed. This equipment has to be placed, and considerable overburden removed before the mining of coal can be commenced. It is

The Coronet Phosphate Company uses this Bucyrus-Erie 375-B electric dragline for removing overburden from their phosphate deposits near Lakeland, Florida.

Giant electric strippers, such as this Bucyrus-Erie 12-yard shovel owned by the Pyramid Coal Corporation, have made it possible to mine profitably by open pit methods coal fields previously considered unavailable.

essential also that the coal can be picked and screened before it is shipped to consumers.

Bituminous coal mining in strip pits has made increasing strides, partly because of economic factors or because of the comparative simplicity of operations, and partly because of the great improvement in equipment which has helped to reduce costs. Electric stripping shovels of capacity as high as 12 and 16 yards, 3¼-yard electric loading shovels, trains with 15 to 40-yard dump cars, improved blasting methods, modern tipples, and a daily production of up to 5,000 tons of coal are some of the features of bituminous strip mines. The usual cover is 15 to 60 feet in thickness. The average coal beds are 18 to 84 inches in thickness, although 22 feet is being mined in Montana and 79 feet in Wyoming. In Illinois and Indiana part of the cover at two mines is removed by draglines and shovels in tandem.

Anthracite has been stripped somewhat irregularly, but the yearly total exceeds 2,000,000 tons. In all, an enormous amount of cover and coal has been removed. Stripping is being done in the Northern, Eastern-Middle, and Western-Middle fields of Pennsylvania. The cost of stripping and mining, according to the Bureau of Mines' Report, ranges from $1.85 to $4.91 per ton of coal produced. The cost of stripping cover with shovels ranges from 4 to 6 cents per yard in Ohio. In a special example of stripping 17 to 25 feet in Wyoming by hydraulicking the cost is 15 cents per yard, which compares with 8 cents at an iron mine in Minnesota, 10 to 15 cents at pebble phosphate mines in Florida, and 10 cents at a gold placer mine in the Yukon where 22,000,000 yards were moved. The total cost of recovering coal at strip mines is 70 cents per ton in Tennessee, 88 cents in Montana, 90 cents to $1.50 in Alabama, $1.05 to $1.37 in Ohio and $1.15 in Illinois.

In iron and copper strip mines the bench system is usually used. This typical view shows the operations of the Nevada Consolidated Copper Company where nine Bucyrus-Erie shovels load the copper ore to cars.

Lignite is mined in North Dakota and Texas, and stripping practice is reported to be improving, particularly in the former state, where con-

(Continued on Page 394.)

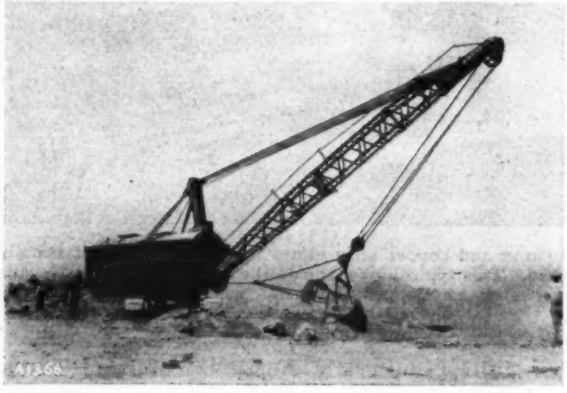
Electric locomotives haul 25-ton cars of nitrate ore from electric shovels.

Mining Nitrate on the Chilean Pampa

Modern mining methods used to develop profitably low-grade caliche deposits of Chile.

By NINA LANE

ONCE upon a time I connected the word "nitrate" with the old lady next door, puttering around her garden, now here, now there. Occasionally she would stoop, and with a lean forefinger draw a circle around a cabbage plant. In the depression she sparingly sprinkled white crystals. Along the rows of young lettuce plants, she made two shallow furrows, one on either side of the row, with the handle of the hoe, and again she sprinkled the white crystals sparingly — oh, so sparingly, taking great care that the magic white did not come in contact with the plants. Nitrate is like some poisons; a little is good, but too much is death. I also remember that the neighbor's garden was earlier than mine — I used no nitrate.



Stripping is handled by Bucyrus-Erie 100-B electric draglines as well as Bucyrus-Erie Diesels.

Nature has collected, it might be thought for contrast, large quantities of a very valuable substance, in one of the most arid and inhospitable regions of the world. This substance can restore to the soil lost fertility, and can assist humanity by increasing crop yields.

In the northern part of Chile there are beds containing great masses of useful materials, such as nitrate of soda or Chilean nitrate, common salt, sulphate of soda, borax, sulphate of aluminum, etc.

Operations Difficult in Inhospitable Dust-swept Desert

This nitrate region is situated between two precipitous mountain ranges far from the coast, and completely devoid of vegetation, water, combustible materials; of everything that is necessary to human life. A wide, lonely, silent country, burnt up by the sun, the elements consuming, little by little, the rugged outlines of the mountains. Midday the sun is blistering hot, and the nights are cold — often freezing. Once during the twenty-four hours, usually in the afternoon or early evening, there is a wind storm, lasting four or five hours, blowing huge spirals of dust before it, across the pampa.

To create and develop the nitrate industry, it has been necessary to find water at a distance of hundreds of miles in places, to import combustible materials necessary for the work, the materials for building, food for the people and forage for the livestock.

From a distance, the nitrate "mine" looks like the feeding ground of a herd of prehistoric animals, but on closer inspection turns out to be a very busy, prosaic, modern and up-to-date excavating job. It reminds one of the development jobs in Florida during the hectic days of 1925. Proposed boulevards to run east and west, joining Ocean Drive here, proposed civic center here, proposed plaza with bandstand there, and proposed library over there, etc. The finished city is left to the imagination, and one can go on proposing — the sky is the limit.

The hard rocky nitrate ore is found in deposits 6 inches to 6 feet in thickness. Here is a Bucyrus-Erie 100-B electric tearing out a 5-foot seam in one of the rajos.

Bucyrus-Erie Dragline and Shovel Working Unit for Each Rajo

The prehistoric looking animals, busily feeding, turn out to be Bucyrus-Erie electric draglines and shovels of the most improved type, industriously digging into the pampa, unearthing desert riches. The location of each pair of machines — a dragline and shovel — is called a *"rajo"* which is a corruption of the word meaning "break." The ground is broken up and the nitrate bearing "ore" removed.

The surface of the nitrate pampa is dusty, and covered by small, flat stones called *lajas,* and sometimes by pieces of flint termed *mellizos.* The *chuca,* which is the covering strata, is always white or gray loose earth, which is mixed with sand or clay. The *costra* is a conglomerate containing nitrate of soda in such a ratio that its extraction is not economical, insoluble materials, chloride and sulphate of soda.

Overburden is drilled with jackhammers using compressed air from power house about two miles away.

The *caliche* is the profitable layer and is formed of a mixture of salts soluble in water, and of insoluble and inert matter. There is a large proportion of nitrate, which seems to hold together the insoluble materials.

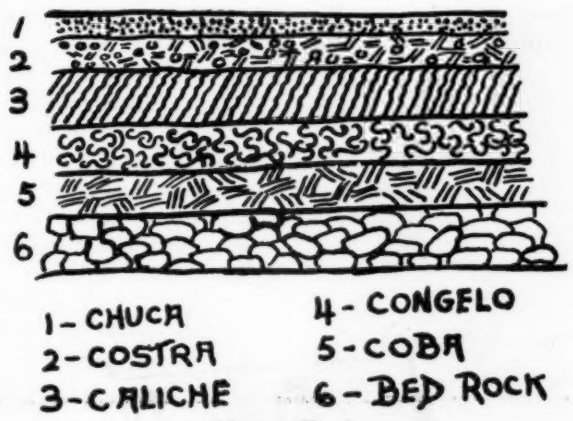


Diagram No. 1.

A diagram of the average *pampa* nitrate field would look very much like the drawing, No. 1. It is, first, the covering strata of *chuca* and *costra.* Second, the profitable layer of *caliche,* and next the lower layer of *conjelo* and *coba.*

The *caliche* is formed of the following salts:

1 — Nitrate of sodium, potassium, calcium and magnesium;

2 — Chloride of sodium, potassium and magnesium;

3 — Sulphate of sodium, calcium, magnesium and aluminum;

4 — Perchlorate of potassium;

5 — Iodine compounds — Iodate of calcium and iodo-chromate of sodium.

The insoluble material consists of rock, sand and clay. The internal strata are unimportant; the *conjelo* is principally formed of chloride and sulphate of sodium, with a few insoluble materials. The *coba* is a layer of loose, in places rather damp, earth, mixed with small stones. This formation is often found on the gentle slopes of the Cordillera de la Costa.

The *caliches* have different compositions, different percentages of salt, different colors and a variable physical appearance. Some are very soluble, others are almost impermeable to liquids, some produce turbid liquids that cannot be decanted, others produce clear liquids.

The nitrate deposits are exploited by most modern mining methods. Cuttings, called *catos* or *tiros,* are made in the soil, which is removed with explosives; trenches are opened and the useful material is separated from the useless portion.

For many years all this mining work was done exclusively by hand, without the help of machinery. Only recently, and in certain places, has it been possible to drill, break and excavate by machines.

In the old method of hand mining the grade of *caliche* was higher, and is today, than the grade mined by machinery.

Yankee Methods Make Operations Profitable

Yankee machines, backed by American brains, have made it possible to work vast tracts of low grade *caliche* with greater profits than those produced by the British, Chilean, Jugo-Slav and French oficinas.

First, after the ground has been broken up by blasting, the surface is cleared away by a dragline.

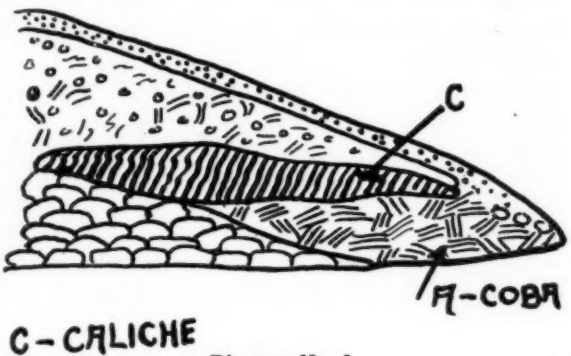
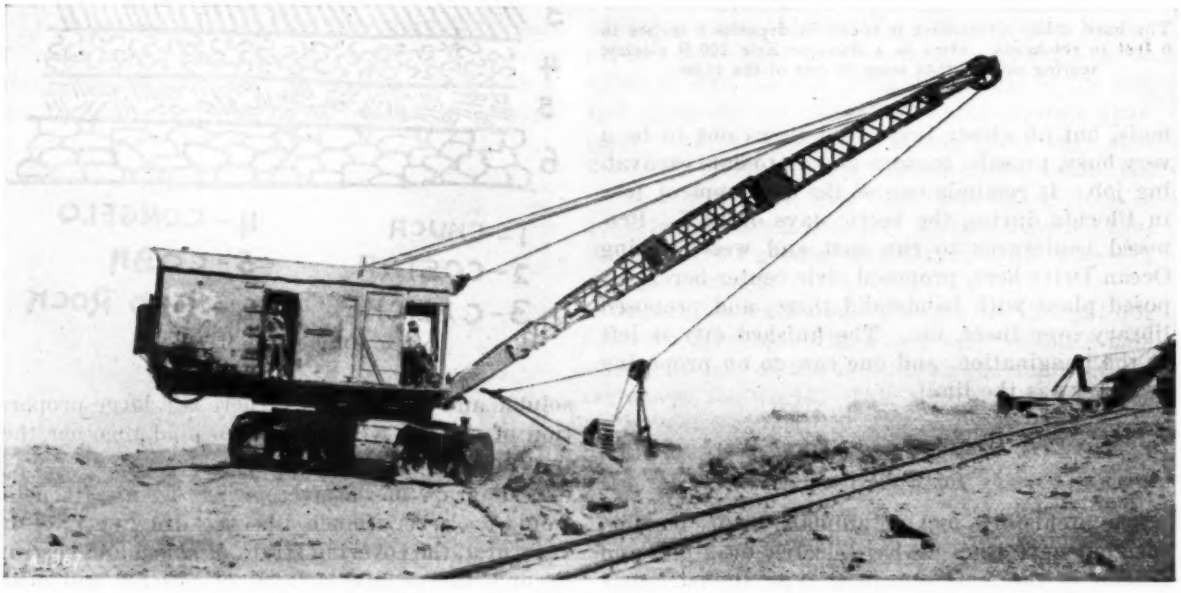


Diagram No. 2.

When the loose overburden is removed, peons with brooms — the regular sort used by American housewives — sweep the dust from the nitrate bearing *caliche.* It looks foolish to see men sweeping the face of the desert with brooms, and the American engineers have listened to many a laugh at their expense, but their profit sheet shows that it pays to get rid of as much useless dust and dirt as possible before the *caliche* is crushed and



Stripping overburden with one of the Bucyrus-Erie Diesels. Note the 100-B electric in the background loading ore.

put into the huge vats where the precious salts are leached out. Many devices have been, and are being, tried to eliminate the dust, but no method has been perfected that works to the satisfaction of the engineers.

After the overburden is removed, holes are drilled in the strata of *caliche*. These are often pockets of *caliche*, and only in parts of the *pampa* where there is, or has been, a little moisture is the *caliche* found in true strata formation. It is usually irregular as in diagram No. 2.

Cutting out three-yard bites of the extremely tough caliche.

The *caliche* is loosened with dynamite, and then the powerful electric shovels load the huge chunks on the cars which carry it to the crusher. The pieces of *caliche* handled by the shovels are larger than those handled by the old-fashioned method. The crusher is larger, there is more dust pouring out of the plant. The dust is so great that the men working in the plant use masks, and often the sun is obscured by its density. There is a filter plant, which manages to extract nitrate from a portion of the dust that is caught from the crusher, but the largest part of it gets away.

Guano Found and Used to Produce Iodine

Very often, at the depth of a meter and a half in the mine, there will be regular pockets of *guano*, in which there are roots, feathers, small bird bones, and brown beetles that look like the ones sometimes found in patent breakfast foods, only larger, and usually without heads. This so-called *guano* is a brown substance that crumbles away when a little pressure is brought to bear upon it, and smells like iodine. I have been informed by engineers that it is *guano*. The natives insist on calling it crude iodine, and slap it on a sore or a cut, and go along about their affairs perfectly satisfied that the wound will heal without any other attention.

If these pockets are *guano*, they do not have the *guano* assertiveness when sniffed.

The small bones that are found look like bird skulls, and small wing and leg bones. The feathers look like a feather might if it had been buried for ages under tons of chemical bearing earth, and also they look to me as though they could be grass stems or parts of sea weed. It is difficult for a novice to tell what things are that "buried once, men want dug up again." These bones, feathers and such like, have gone through earthquake, flood and semi-tropic sun, not to mention being blown up with black powder and dynamite, and one may be forgiven for being doubtful as to their origin. The beetles I am positive about, for I have seen them lo, these many years, with their tiny little legs crossed on their plump little stomachs, and I cannot be mistaken about them.

The crushed *caliche* is leveled off in large concrete vats, where heated "mother liquor" is poured over it. Covered with this warm liquor, it is left to leach out.

The mother liquor is water containing a low per cent of nitrate and other chemicals. It is from this solution that the by-product, iodine, is extracted, and that in itself is a painstaking and exacting process; unless care is used the mother liquor can be ruined — likewise the iodine.

Looking over a loaded dipper at the sturdy front end of one of the Bucyrus-Eries.

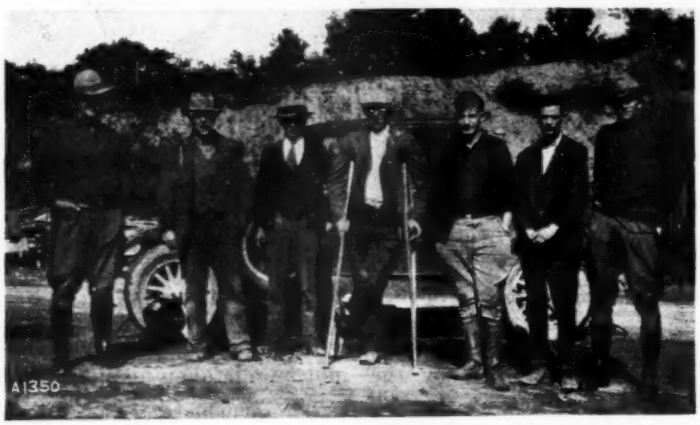
The usual time for leaching a vat containing seven thousand tons of crushed *caliche* is eighty hours. The liquid drains off into pipes which lead to the crystallizing plant, where, under centrifugal force, the nitrate crystals are separated from the water and other chemicals.

Nitrate is known familiarly under the name of salitre. Saltpeter is another name for it.

(Continued on Page 418.)

Morgan and Carll turn out good records on New York paving job

ON the Olean-Portville New York state contract No. 1728, Morgan and Carll turned out a number of very good performance records. This work was handled by a combination of J. F. Morgan and P. N. Carll acting as subcontractors for the J. F. Morgan Company. Mr. Carll has been prominently active in the construction of several large highway contracts in New York state, while Mr. Morgan is a road builder of note who has built roads in both Pennsylvania and New York. Contract No. 1728 was for reconstruction between the cities of Olean and Portville, consisting of placing reinforced concrete pavement twenty-seven and thirty-six feet wide, extending for a distance of 4.69 miles and being eight inches in uniform thickness. The principal items of the contract were 53,000 cubic yards of unclassified excavation and 17,000 cubic yards of concrete pavement, including the erection of three bridges.



The above executives of the Morgan and Carll organization and State employees are, left to right: Trooper Wheeler; J. F. Morgan, Contractor; R. E. Brundage, Office Man; P. N. Carll, Contractor; W. J. O'Brien, Chief Engineer for State; W. T. Gilligan, Timekeeper; and Trooper Kramp.

Batch plant supplying the two paving machines with the Bucyrus-Erie B-2 that unloaded 880 cars in 44 days.

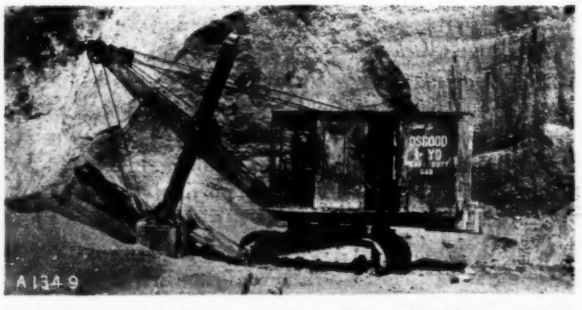
That steam is still an active contender in the shovel and crane field was proven by records established on this job. A Type-B Bucyrus-Erie crane, mounted on traction wheels and carrying a forty-foot boom and a ¾-cubic-yard Williams bucket, unloaded an average of twenty cars of sand and gravel per day for forty-four days. This machine is owned by Mr. Morgan and was operated by our old friend George D. Conns.

The type of construction on this job was two course, and two kinds of gravel were unloaded from concrete pits while the sand was taken directly from gondolas. This batch plant was so efficiently operated that they were able to supply a Smith 21E and a Rex 27E.

At times they were laying as high as 2200 lineal feet of nine-foot pavement, and one record day placed 2343 lineal feet or 567.25 cubic yards concrete. Mixing and placing operations were in charge of Superintendent G. R. Cripps and Concrete Foreman Robert Sietler.

For driving the piles for the bridges they used Mr. Carll's one-yard Osgood shovel operated by his son, C. E. Carll. A Buffalo-Pitts ten-ton steam roller was used to furnish the steam for the steam hammer. The Osgood was also used on run of bank gravel when not driving piles.

For the excavation at the bridges they used Tower Brothers Type-B Bucyrus-Erie shovel operated by Lawrence Ransome.



C. E. Carll at the levers of Osgood Gas machine used for driving piles and loading bank gravel.

By maintaining traffic without holding up work the State troopers were of great help to the organization in maintaining high-speed production.

Placing 164,000 feet of 74-inch steel pipe for Wanaque Aqueduct

Two views, which show method of handling excavation of trench and laying of the seven-ton pieces of pipe.

T. A. Gillespie Company handle half million cubic yards of excavation on giant pipe job for the North Jersey District Water Supply Commission

▼ ▼ ▼

WELL under way at this time is the contract of over $5,000,000 for New Jersey, which is being handled by the T. A. Gillespie Company of 7 Dey Street, New York. This project for the North Jersey District Water Supply Commission consists of excavation for, and the laying of, 164,000 lineal feet of 74-inch lockbar steel pipe in a line approximately 14 miles long from the Wanaque Dam (constructed under previous contract) to the North Portal of the Great Notch Tunnel, in addition to a single line of pipe about 4 miles from the south end of the tunnel to the Belleville Reservoir. In the former section of twin lines the ditch is 15 feet wide on the bottom, 30 feet wide at the top, and 10 feet deep. The 74-inch pipe comes in 30-foot lengths and weighs 7 tons to each length.

The total excavation of 500,000 cubic yards consists of gravel, some clay and hard pan, and a small amount of rock. About 330,000 cubic yards of refill and embankment will be required. While for the most part the construction is cut and cover job, special handling is required at several stream crossings. In laying out the aqueduct, advantage was taken of the abandoned Morris Canal and the lines extend for approximately 8 miles in the canal bed.

The 30-foot lengths of pipe are fabricated at the shop of the East Jersey Pipe Company, at Leetsdale, Pennsylvania, and shipped to the job in gondolas carrying a double deck of pipe through an ingenious arrangement of special stanchions and blocking for supporting one pipe length on top of another. From these cars pipe are transferred to Republic motor trucks and trailers and hauled to loading platforms, where they are put on narrow gauge railway trucks. Following the Aqueduct trench, and mounted on low cradles, the pipes are then hauled by Vulcan gasoline locomotives—six pipes to a train — to the proper location along the trench.

The work is being handled by the following excavating equipment: two Bucyrus-Erie 50-B Diesel dragline-cranes, 50-foot booms, and Blaw-Knox 1½ and 2-yard buckets; one Link Belt K-55 dragline-crane; two Northwest No. 5, one Northwest No. 4, and two Koehrings, No. 501. The bulk of

Guiding a 30-foot length of pipe into place. Ready convertibility as crane, clamshell or dragline proved of value in handling this operation.

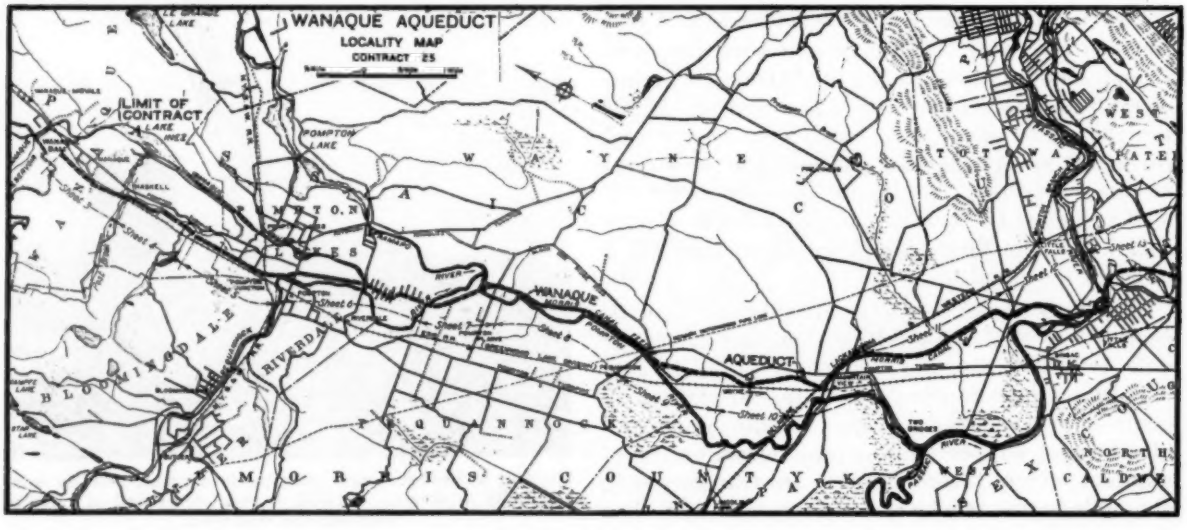
On the Wanaque Aqueduct, excavation with Bucyrus-Erie 50-B Diesels has run as high as 1100 yards per 10 hours, and fuel consumption averages from 30 to 40 gallons of Diesel oil per day.

the excavation is being handled by the two 50-B Bucyrus-Erie Diesels, the Link Belt and the Northwests. Production of the 50-B machines average 800 yards for 10 hours, with a record production of 1100 yards per 10 hours. In addition to excavating for the trench these machines also place the 7-ton lengths of pipe. Fuel consumption averages from 30 to 40 gallons of Diesel oil per day.

At some points the presence of ground water required the installation of a Moore-trench well-point system, so that excavation might be handled in the dry.

After each length of pipe is lowered the joint is bolted up temporarily prior to riveting. Each pipe length is tapered permitting telescoping together. A sledge hammer is used to lay up the steel pipes, and then the joint is riveted, the rivets being driven from the inside of the pipe. Bucking up is handled with a sledge, which is passed under a chain encircling the pipe, thus giving an opportunity to secure leverage against the rivet head. Ingersoll-Rand portable gasoline compressors furnish the air for riveting and calking.

The work is under the supervision of Fuller & McClintock of New York, consulting engineers for the North Jersey District Water Supply Commission, and Donald W. Howes is supervising the field work for them, while A. A. Jones is executive



Blaw-Knox heavy-duty dragline bucket cutting into the gravel. Clay, hardpan and a small amount of rock was also encountered.

engineer with headquarters in Newark, New Jersey. M. J. Coffey, vice-president of T. A. Gillespie Company of New York is in charge of the operation for the contractors.

Hot and Cold, Running ——?

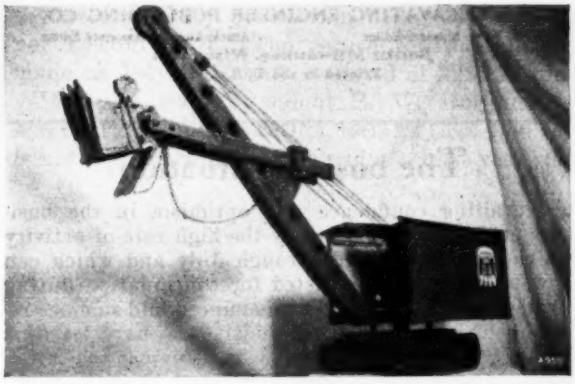
A colored preacher gathered his congregation about him one Sabbath morning by the banks of a stream. His main topic of conversation was "Free Salvation." After preaching at great length on this subject he said, "Now, Brother Smith, will you take up the collection?" At this, one old darky at the far edge began shifting away and said, "Rev., I thought you said salvation was free, free as the water we drink."

"Well," responded the preacher, "water is free, and salvation is free, but when we pipes it to you, you has to pay for it."

Dumb Dora is so dumb she thinks "no kidding" is a slogan for birth control. — *Michigan Gargoyle.*

Royal School of Engineering in Rome, Italy, Studies Shovel Operation from Model Machines

Students at the Royal School of Engineering in Rome, Italy, are given instruction in excavating machine problems by practical demonstrations with a Bucyrus-Erie 50-B model dragline which they have had for some time. They have now added to this equipment a small wood model of a



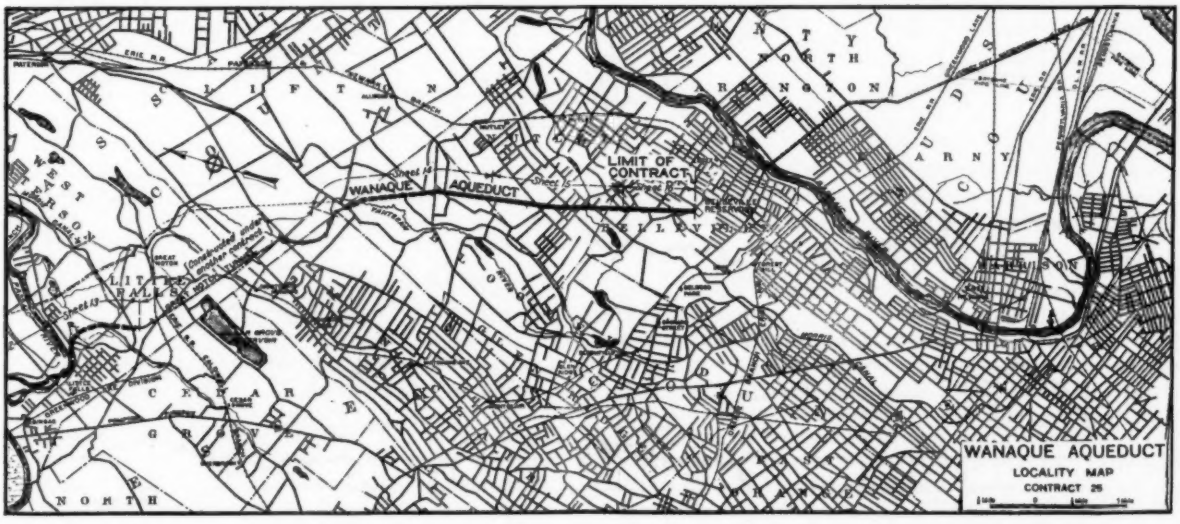
D-2 shovel which is shown in the illustration. These models were prepared by F. Fiorentini & Company of Rome, who also have a working model of the Bucyrus-Erie D-2 in their office, where it is used to demonstrate the efficiency of the rope thrust operation.

Boss: "Say, where in blazes are you two niggers going? Why don't you go to work?"

Mose: "We'se working, boss. We'se carrying des heah plank up to de mill."

Boss: "Plank. I don't see any plank."

Mose: "Well, fah de Lawd's sake, Sam, ef we ain't gone and clean forgot de plank."



The EXCAVATING ENGINEER

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The business situation

Prevailing confidence and optimism in the business outlook is supported by the high rate of activity which was maintained through July and which can now be definitely forecasted for continuation during the month of August. No pronounced mid-summer recession is evident, and pessimists who have feared a major reaction must postpone still further the fulfillment of their predictions. However, some slowing down can, without doubt, be expected following such an extended period of activity.

Sustained activity in domestic trade and industry has resulted in full employment of labor and large purchasing power in the form of payrolls, which are estimated to be running nine per cent over those of last year as indicated by representative figures from a broad group of manufacturing industries. The latest reports of the United States Department of Labor indicate that there has been a slight decrease of employment in manufacturing plants this summer, but this seasonal slump is being partly offset by an increased demand for agricultural workers.

Fewer Industrial Disputes Aid Prosperity

General prosperity has been helped by the decrease in industrial disputes, relations of employers and labor throughout the country having shown a pronounced improvement. The agricultural outlook is good, and farm purchasing power has been expanded by the recent sharp rise in the prices of grain and live stock.

A tabulation made by the National City Company of New York, covering six hundred leading corporations classified according to lines of business, shows for the first six months of 1929 reported aggregate net profits of $2,083,823,000 compared with $1,674,888,000 in the same period of 1928 and representing a gain of twenty-four per cent.

This industrial prosperity promises the expansion and improvement of properties. The Illinois Steel Company, a subsidiary of the United States Steel Corporation, has announced that it will spend approximately 100 million dollars for plant expansion in the Chicago district. This single project will add about 2½ per cent to the plant capacity of the country as a whole, and indicates confidence in the country's growing requirements.

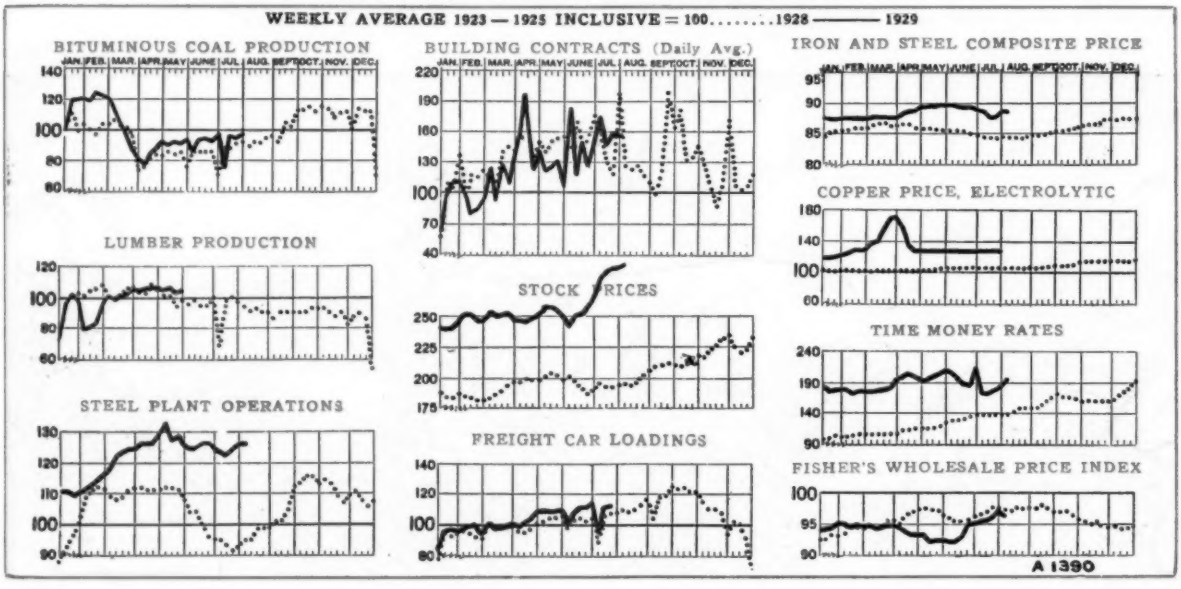
Construction Awards Show Healthy Increase But Contemplated Projects Show Decrease

Total construction contracts awarded during July in the 37 states east of the Rocky Mountains amounted to $652,436,100, according to the F. W. Dodge Corporation. These states include about 91 per cent of the total construction volume of the country. This was the second largest monthly total on record, and represented an increase of 12 per cent over the total for July 1928, and an increase of 20 per cent over that for June 1929.

Three districts made new high totals for the month of July. These districts were New York State and Northern New Jersey, the Middle Atlantic States and Texas. The New England States had the second highest July total on record.

The most noteworthy items in the building record for the 37 Eastern States were as follows: $199,925,-

WEEKLY BUSINESS INDICATORS



500, or 31 per cent of the total, for residential buildings; $194,546,700, or 30 per cent, for public works and utilities; $91,348,300, or 14 per cent, for commercial buildings; $66,604,000, or 10 per cent for industrial buildings; and $47,979,300, or 7 per cent, for educational buildings.

During the first seven months of this year there was a total of $3,683,982,900 worth of new building and engineering work contracted for in the 37 Eastern States, as compared with $4,028,299,900, the total for the first seven months of 1928, a decrease of 9 per cent.

Contemplated projects reported in the 37 Eastern States during July amounted to $480,212,100. This amount was 26 per cent less than the contemplated work reported during July 1928 and 24 per cent less than the amount reported during June of this year.

Cement Shipments Show Increase of 1.9%

The ratio of the operations to the capacity of the American portland cement industry during the month of July was 80.4 per cent, according to figures released today by the Bureau of Mines of the Department of Commerce. During the month 17,216,000 barrels were produced, 20,273,000 barrels were shipped, and there were in stocks on hand at the end of the month 24,372,000 barrels. Production in July, 1929 was 1.5 per cent less and shipments 1.9 per cent more than in July, 1928. Stocks at the mills were 7.9 per cent higher than a year ago.

As this is written the stock market seems to be readjusting itself. If this readjustment is carried on slowly and if sharp fluctuations are avoided, the result will be of decided advantage to industry. It is not logical for the prices of stock to discount, in fact, over-discount, future earnings as they have during the past few months.

Operation Costs at Quarries

In the course of a general study of quarrying costs, being conducted by the *United States Bureau of Mines, Department of Commerce,* information has been obtained from a large number of operators of limestone quarries giving cost figures covering removal of overburden, drilling, blasting, loading, power shovel duty, transportation, crushing, storage, drying, screening, elevating, conveying, etc. A summarization of this information has been published as Serial 2911, by J. R. Thoenen, mining engineer, Bureau of Mines.

While the cost figures are tentative, being based on partial returns, the chief purpose in publishing them at this time is to indicate to operators who have not yet replied to questionnaires the value of such service by the Bureau of Mines, and thus encourage a wider co-operation. The ultimate goal is the establishment of a standard cost keeping system for stone quarry operations, with which, once established, more intelligent and effective studies could be made of the economic phases of stone quarrying.

Beg Your Pardon

In the August issue of *The Excavating Engineer* we showed an interesting group of pictures of a fire-fighting crane recently employed in smothering an oil well fire. We omitted mention that these pictures were presented to you through the courtesy of *Fire Engineering.* We regret the omission of this credit in our August number.

N. E. Stone & Company make noteworthy record on Kentucky graveling job

In McCracken County, Kentucky, N. E. Stone & Company recently secured a contract of graveling on the Paducah and Mayfield Road. The job requires 15,140.57 tons of bank gravel to be loaded from the Durbin Pit at St. Johns. Using their Bucyrus-Erie B-2 steam shovel N. E. Stone & Company completed the job in seven and one-half days, the average daily production being 2018.74 tons per 12-hour shift. The record for the job was made on July 19th, and consisted of 2215.27 tons.

However, Superintendent H. W. Morgan who had charge of the operation, tells us that even this is not the record for this machine. Last year they

N. E. Stone & Company's Bucyrus-Erie B-2 steamer in bank gravel where an average of 2018 tons were taken out each 12-hour shift. H. W. Morgan, superintendent, is standing on the dipper.

put out in a single day 2621 tons. They also achieved further distinction in completely graveling five and one-half miles, using 20,173.3 tons of bank gravel in seven and one-half days, the quickest job of its kind ever finished in the State of Kentucky. It is perhaps unnecessary to say that Superintendent Morgan is enthusiastic about his Erie steamer. N. E. Stone & Company have two additional B-2's which have been very successful in handling Kentucky road work and other excavation.

Figures for the Paducah and Mayfield Road job are verified by Oscar Elmore, weighman, and are also on record with the State Highway Department at Frankfort, Kentucky.

The railroads of the United States and Canada during 1928 handled more than a half billion pounds of black powder, dynamite and other high explosives without the loss of a life or a personal injury, according to the annual report of the Bureau for the Safe Transportation of Explosives and Other Dangerous Articles. Money losses were negligible, amounting to $77. These were due to twelve separate explosions of parts of shipments of toy torpedoes, toy caps and other such fireworks and were caused mostly by the dropping of packages in handling.

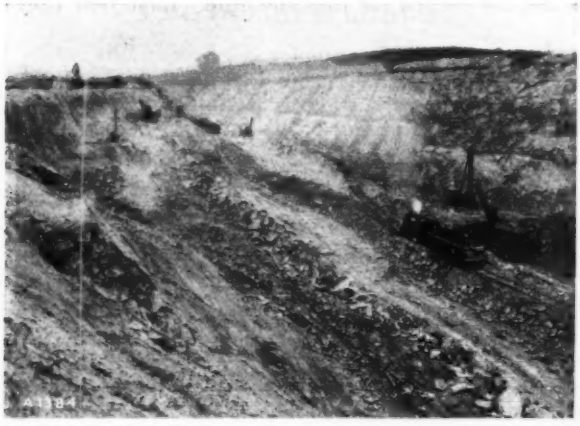
Open Pit Mining Methods

(Continued from Page 388.)

ditions are generally favorable. The cover is easy to dig without shooting; so is most of the lignite. The average thickness of cover is 25 to 35 feet, and that of the lignite 8 to 18 feet. Draglines, stripping shovels, and loading shovels are employed. The cost of stripping is 6 to 15 cents per yard for 10 to 45 feet of cover, and the cost of mining is 10 to 25 cents per ton for 8 to 18 feet of lignite.

Copper Extensively Mined by Strip Methods

The stripping and mining of copper ore represent a highly developed and extensive phase of the mining industry. In a recent year 60 shovels stripped at least 16,000,000 yards of capping, and 24,000,000 tons of ore in 30 to 70-foot benches in mountainous country. Total strip mine production (for 1926) was estimated at 27,000,000 tons with 700,000,000 tons left available.



A typical basin stripping job in the Pennsylvania anthracite is shown by one of Contractor J. Robert Bazley's operations illustrated above. Here the pit will run 150 feet deep, benches are worked out 15 to 20 feet deep, and ½ to ¾ pounds of explosives are used per ton of rock. A Bucyrus-Erie 50-B electric may be seen in the foreground loading the coal to 50-ton cars.

The cost of stripping the capping ranges from 29 to 51 cents per yard and mining the ore from 31 to 81 cents per ton. The cost of mining includes a proportion of prepaid stripping charges. These figures compare with 68 cents per yard for capping and 46 cents per ton for ore in Chile, with American equipment and superintendence.

Iron Ore Mined in Open Pits on Enormous Scale

Iron ore has been stripped and mined for years on an enormous scale. As a whole, operation is on a greater scale than at open-pit copper mines, but the average production of the many iron mines is much less. No iron mine handles by a large tonnage as much material as the benches at Bingham, Utah, and few of the iron mines handle as much as the other copper mines. However, the removal of up to 21,000,000 yards of capping and 35,000,000 tons of iron ore in a season of eight months with 300 to 400 power shovels in operation and standard transportation is a great feat.

In Minnesota the cost of stripping overburden is 30 to 40 cents per yard. Occasionally the conditions and overburden give a lower cost, and contracts have been let at 21 to 26 cents per yard. The cost of removing rock is 45 cents to $1.25 per yard. The cost of mining ore varies from 27 to 50 cents per ton. The average of several large operations is 40 cents.

Pebble Phosphate

Comparatively simple technique — the use of draglines and hydraulicking for overburden and hydraulic mining of the matrix — suffice to recover 2,750,000 tons of pebble phosphate a year in Florida. The overburden is mainly composed of soil, sand, sandy clay, and friable sandstone, and is easily stripped.

Heavy duty, 4-yard, Bucyrus-Erie, full revolving, electric shovel in the Susquehanna Pit of the Hanna Ore Mining Company on the Mesabi Iron Range of Minnesota.

Drilling and Blasting at Stripping Operations

Well or churn drills are used in prospecting and in blasting at stripping operations. The type to be used depends upon the character of the overburden of ore, the method of mining, and the equipment available. Piston drills or hammer drills are used at the metal mines, (for hard rock and bench work) and also at anthracite pits.

Blasting is necessary at all but pebble phosphate mines. For actual blasting, black powder is generally used at coal mines, and at copper and iron mines both black powder and dynamite of various strengths are used. Fuse and detonators and electric detonators with blasting machines are used to set off the charge. In general, air-drill holes are loaded with stick explosives though bulk explosives are sometimes used.

Use of Liquid Oxygen Explosive Increasing

The use of liquid oxygen explosive for shooting overburden is increasing, particularly at coal mines. The Bureau of Mines has information of its use at five large strip coal mines. At one property in Indiana the physical and financial results were so satisfactory that the oxygen plant was doubled. Black powder was formerly used. At another mine liquid oxygen replaced dynamite. At a large open-pit copper mine in Chile owned by American capital liquid oxygen is now breaking more than 1,000,000 tons a year. The size of the oxygen plant was recently tripled. It appears to be adapted to open pit work and its use in such projects will expand.

Electric Shovels Increasingly Popular

Great advances have been made in the designing and construction of shovels. Stripping shovels are made in sizes ranging from 3 to 16-yard capacity. Loading shovels range from ¾ to 3¼-yard capacity. There are 800 to 900 shovels of all types working at strip mines. Naturally most of these are steam driven, but the trend to the use of electric shovels and to electrification of steam shovels is decidedly upward. Open-pit mining is largely a problem of transportation of stripped overburden and mined minerals. This is more complex at copper and iron mines because of the bench system of mining. In nearly every instance steam locomotives are employed, and certain types have become more or less popular, particularly at coal mines. But, as with the shovels, electric locomotives are finding a place, especially at copper and iron mines.

Strip or open-pit mining is adapted to minerals of low market value. For instance, anthracite averages $5.60 in value a short ton and bituminous coal $2.20; copper, $2.80 to $4.40 a long ton; iron, $4.55 a long ton; bauxite, $6.15 a short ton; and pebble phosphate, $3 a long ton. These same minerals, except pebble phosphate, are also mined by underground methods, sometimes in the same districts, and sell on the same market, yet naturally production costs are higher.

In the anthracite regions of Pennsylvania overburden runs too deep for the side casting method of the soft coal districts. The overburden, with a large percentage of heavy rock, must be hauled to dumps, so here the present-day trend is to the heavy-duty, electric, quarry and mining shovels as represented by J. Robert Bazley's 3-yard machine shown above.

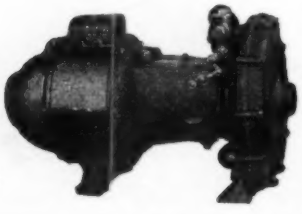
Much additional detailed information in regard to the machinery and methods employed in mining by the stripping method in various fields of the United States is given in Bureau of Mines Bulletin 298, "Methods, Costs, and Safety in Stripping and Mining Coal, Copper Ore, Iron Ore, Bauxite, and Pebble Phosphate," copies of which may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at a price of 70 cents.

Typical modern bituminous strip coal operation at a Du Quoin, Illinois, mine of the Pyramid Coal Corporation. In the foreground is a Bucyrus-Erie 3¼-yard coal loader digging out the coal seam, while in the background is a Bucyrus-Erie 12-yard electric stripper casting overburden into the mined-out area.

EQUIPMENT YOU OUGHT TO KNOW ABOUT

New Steam Turbo Generator

The Moon Manufacturing Company of Chicago, 128 North Jefferson Street, Chicago, Illinois, well-known makers of portable lighting plants, announces to the construction field the manufacture of a new Type 12 Steam Turbo Generator. These units built in 2 kw capacity, are made especially adaptable for the average size lighting job, and will furnish voltages of 32, 110 and 220 d.c.



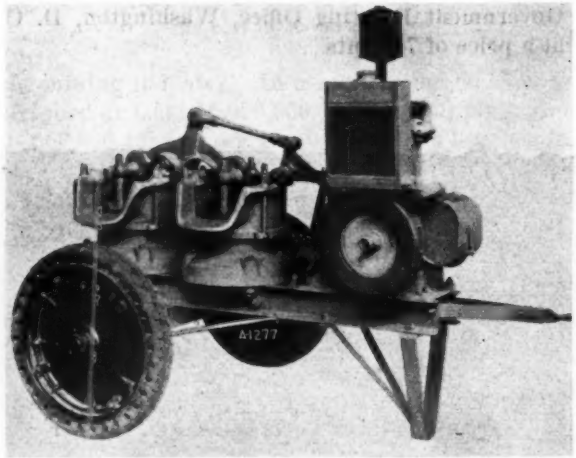
The Type 12 is the very latest Moon product, and combines many new features of convenience and reliability, which will be of special interest to contractors. It has been subjected to rigid field and factory tests for over a year, and is now offered to the trade as a proven piece of equipment.

Bulletin No. 16 describing this new generator will be sent to anyone requesting it. Please mention *The Excavating Engineer* in writing.

New Double Diaphragm Pumping Unit

The John Lauson Mfg. Company, New Holstein, Wisconsin, recently announced the new Lauson Double Diaphragm Unit with 3-inch Pump. This new pump is powered by a 2½ to 3 h.p. Lauson vertical radiator-cooled engine.

The features of the Lauson engine, which will be furnished with any of the leading makes of diaphragm pumps, include the Hutto ground cylinders

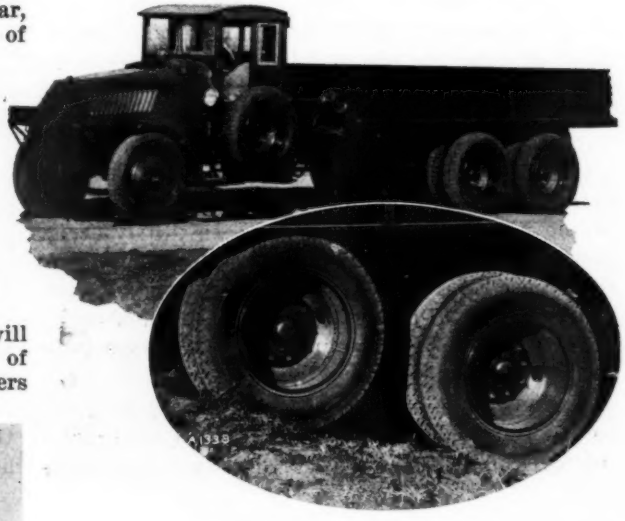


(the method employed in grinding cylinders by many of the automobile and airplane engine manufacturers), Wico high tension ignition system, which furnishes a hot spark for easy starting as well as providing complete combustion at all times while running, and the heavy 1⅜-inch counterbalanced crankshaft. Other features are the mechanically driven flyball governor (enclosed in dust-proof housing), roller bearing mounting of the crankshaft, gray iron pistons, designed for high speed performance, and an improved oiling system.

These units, which have been in production about 60 days, are mounted on a two-wheel cushion trailer, as shown in above picture, or on four-wheel trucks, and may be just the equipment you are looking for. When writing the manufacturers please mention *The Excavating Engineer.*

New Mack Super-Duty Trucks

Mack Trucks, Incorporated, recently announced a Super-Duty line of trucks, two models of which are designed to carry great loads of high speed — the AP 4-wheeler and the AP 6-wheeler. These trucks,



powered by 6-cylinder high compression engines of 150 horse power, will carry from 7½ to 10-ton loads at 30 miles per hour and climb 20 per cent grades with ease. They will haul 35-ton drawbar loads at 25 miles per hour.

In addition to the AP Models, the line includes the AC Model for hauling heavier loads under difficult conditions encountered in the excavating industry. This model features the four-wheel (rear) drive, retaining the same drive, which permits greater flexibility of spring and axle movement than can be obtained in any other method of final drive. The above picture shows the AP 6-wheel model and the insert shows the flexibility of the two rear wheels.

No Spectacles Needed

Mary had a little skirt,
So neat, so bright, so airy.
It never shows a speck of dirt,
But it surely does show Mary.

SHOTS FROM THE FIRING LINE

Major Reimer Seeks Completion of Pan-American Highway at Rio de Janeiro Highway Congress

Major Frederic A. Reimer, East Orange, New Jersey, President of the American Road Builders' Association, attended the Second Pan-American Highway Congress held at Rio de Janeiro, August 16 to 31st. He asked consideration of the completion of the Pan-American Highway. According to Major Reimer, this highway would be the backbone of a later highway system that would reach every city in every American Nation.

El Salvador will be one of the first of the Central American nations to finish its section. Salvador is already connected with Guatemala by a highway, and the link with Honduras, can easily be completed. The governments of Panama, Guatemala, Honduras, Costa Rica and Mexico are on record as acting in furtherance of the plans, although handicapped by lack of finances.

Highway finance problems and engineering plans were discussed by Major Reimer, as well as the means of bringing public opinion to regard the highway as an investment in general prosperity, better living conditions, and an actual commercial investment that will pay returns in cash.

Canada

Toronto Notes

Kilmer and Barber, Limited, Toronto, Ontario, have been using their Type A Bucyrus-Erie steam shovel recently on an important street widening job in that city. Bill Barclay, who has been operating this shovel for the past eight years, said

"It is the finest shovel in the world. It is not afraid of anything, and although only a half-yard capacity, is tearing up six-inch concrete with asphalt surface!" The above view shows the Type A loading the torn-up pavement into truck.

Winnipeg and Vicinity

C. W. Cox of Port Arthur, Ontario, has been awarded the contract for the grading of 13 miles of road on the Scott Highway, between Port William and the international boundary.

Manitoba Notes

The Kane Construction Company of Winnipeg, Manitoba, and D. A. Taylor, Oak Lake, Manitoba, have obtained general contracts for grading some 40 miles of trunk highway in the municipalities of Macdonald and Pombina, respectively. A. McGillivray, Parliament Building, Winnipeg, Manitoba, is highway commissioner.

British Columbia Notes

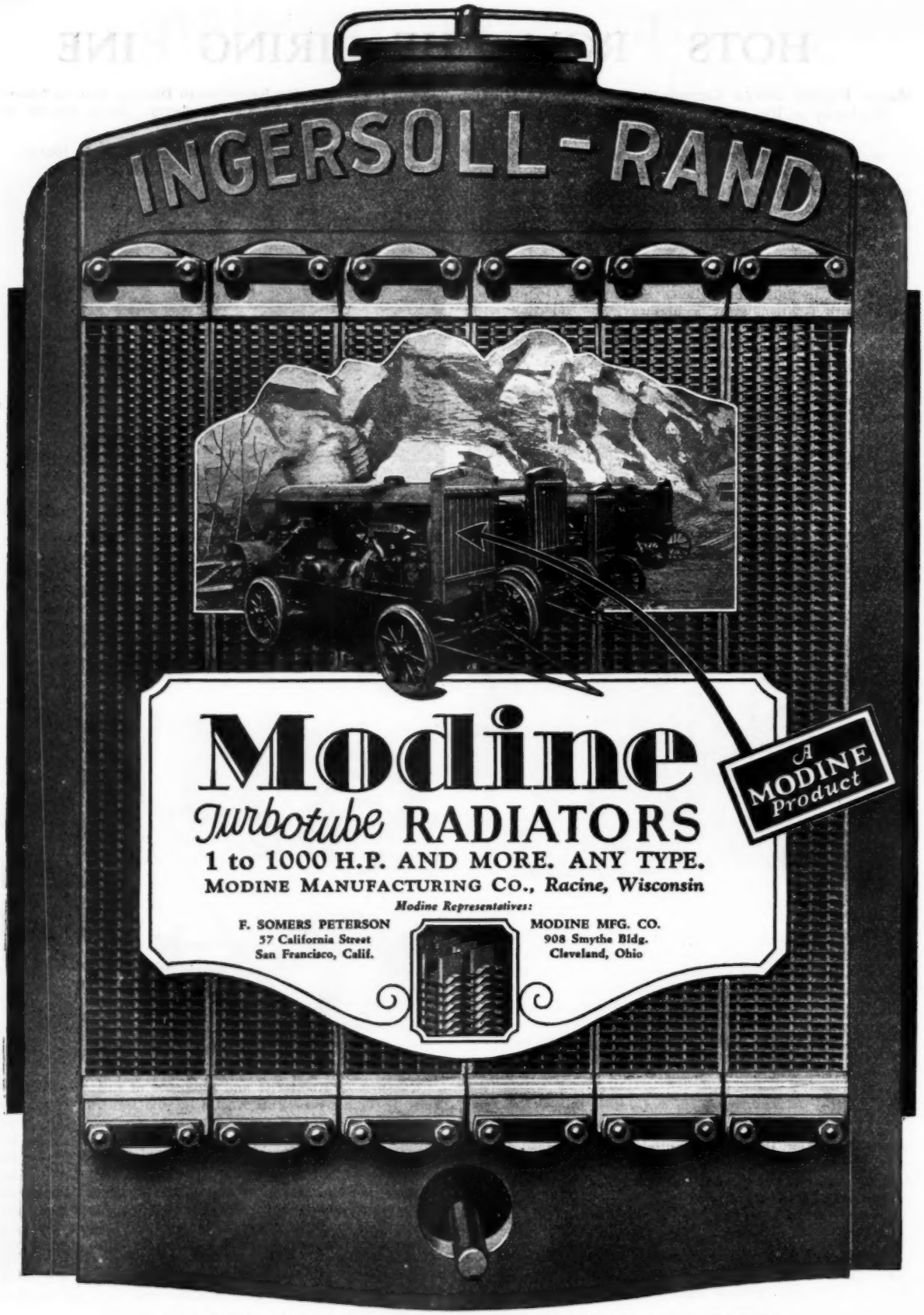
The Department of Public Works, Parliament Buildings, Victoria, British Columbia, have awarded contract to J. Broley of Fernie, British Columbia, for construction of 9 miles of roadway in the Kaslo-Slocan District, road to follow route between Box Lake and Roseberry. About $35,000 is involved.

New York State Notes

BY W. R. BEERE

Herman Snyder and Sons of Dolgeville, New York, have a large and important contract at Hunter's Creek: Contract No. 10 of the Hudson River Regulating District Project at Northville, New York. They are handling about 65,000 cubic yards of excavation for a dam, making a permanent lake and a roadway across a ravine. "Connie" Hall is operating the new Bucyrus-Erie 1030 shown in the above picture. The group shown consists of Dan Sweet, contractor Fred Snyder, engineer "Tiny" Slade, Bill Lamb and A. Hurley.

The firm of **Koetteritz and Blakeslee of Little Falls, New York,** is composed of Burt Koetteritz and Dan Blakeslee who are shown in the order named in the above group. They have been fortunate in getting most of their work within a radius of 100 miles of Little Falls. "Burt" is running a job of six miles between Amsterdam and Broadalbin, New York, while "Dan" is just finishing a job of five miles between Amsterdam and Ahirsville, New York. This firm has just purchased their fourth Bucyrus-Erie, and like their other machines it is a B-2 steamer. Johnny Hines of Rome, New York, is operating the new B-2 shown in the upper view, while Neal Havens is operating one of the other machines. Neal has a lot of friends in Virginia who will be glad to know that he is feeling fine.



In writing to Modine Manufacturing Company please use post card bound in the center of this number.

Where Track Must be Shifted or Raised

The above illustrations show the Track Machine used for building a fill on a railroad construction job, shifting track in building a yard and on heavy main line ballasting.

The performance of Track Machines in service on railroads, contracting jobs, mines and other applications where track is shifted and raised, demonstrates the advantages of this unusual machine over hand methods. In addition to effecting a big saving in labor expense, it permits of faster operation and will work under conditions where it would be almost impossible to work by hand.

The many satisfied users of the previous model are surprised at the performance of the new Model "S". The design as now offered is at least 25 percent faster. Its ease in handling appeals to the operator.

Those who have track to raise and shift, whether standard or narrow gauge, will find a great time and labor saver in the Nordberg Track Machine.

Write our Railway Equipment Department for Bulletin GR-8 on how this machine can be used on your jobs. Perhaps there is an installation in your vicinity.

Nordberg Mfg. Co., Milwaukee, Wis., U. S. A.

THE NORDBERG PATENTED TRACK MACHINE

In writing to Nordberg Mfg. Co. please use post card bound in the center of this number.

SHOTS FROM THE FIRING LINE — Continued

Maryland Notes

BY G. E. FOSTER

Curtis Airplane Company has purchased a large tract of land near Pikesville, Maryland, for an airport. Contract for 300,000 yards of grading is now pending, bids having been received, but low bidder has not been announced.

Virginia Notes

BY JOSEPH S. POTTS, JR.

J. J. Battershill & Son of Virgilina, Virginia, are quite proud of the record made by their Type B Bucyrus-Erie No. 2210, now six years old. Though idle for one year during the period of their ownership, it has dug 310,000 cubic yards of excavation of which 165,000 have been in rock cuts with no earth to be handled at all. In addition it has traveled over 300 miles on its own caterpillar-type mounting, and T. C. Battershill tells us that the machine is today capable of delivering from 800 to 1000 cubic yards per ten-hour day, these figures being based on actual present - day accomplishment. Though it has never been necessary to use even a flue roller on the machine there is no appreciable leak in the tubes.

J. J. Battershill & Son own three Type-B Bucyrus-Erie machines, and are turning out some beautiful grading with them.

South Carolina Notes

BY E. P. DOYLE

Operator P. F. Burke formerly of Tyler, Texas, is running one of the 103 Bucyrus-Erie shovels for Arundell Construction Company and helping to pile in the eleven million yards of dirt that goes in the Saluda Dam at Lexington, South Carolina. Mr. Burke tells us that this is his first job on a 103 and that he "likes her fine." It is no trouble, he says, to load a 12-car train of twelve-yard cars in twelve minutes when the digging is good. G. M. Church is craning for him and G. E. Church is hustling the fog. Good men, both, says Burke.

Philadelphia Notes

BY J. F. TAIT

Morauer Brothers & Hartzell of Philadelphia are about finished on New Jersey State highway job subbed from Frank Grant. They started on 135,000 cubic yards of borrow April 18th. On July 11th Ray Hartzell dropped into the office to say "hello" and order some repairs, and tells us they have moved 100,000 cubic yards to date. The digging was easy but the bottom was soft and wet. Ray says the single shaft drive caterpillar on the Gas + Air pulled out of some awful holes.

Pittsburgh and Vicinity

BY J. S. WEAVER

Director of Public Works, E. G. Lang, City of Pittsburgh, on July 15th announced the awarding of city contracts worth $438,359.32. None of the improvements are particularly large in their scope, but many of them dovetail into larger projects, and will, therefore, serve general as well as local uses.

An intensive dredging program as planned by the corps of Engineers, United States Army, now is under way throughout the entire length of the Ohio River. This final stage of improving this 964-mile stream in order to complete the extension improvement program of one of the arteries of a

GREDAG
REG. U.S. PAT. OFF.
LUBRICANTS
FOR ENDURANCE

No. 52

is the correct grade for most bearings. Applied by compression cups or grease guns. Softer grades for high speeds. Stiffer grades for heavy duty. Resists shocks, pressures and weather. Seals out water and grit.

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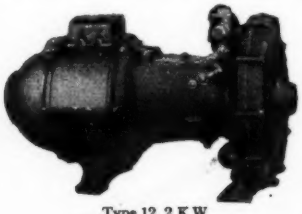
Unit of Union Carbide UCC *and Carbon Corporation*
NIAGARA FALLS, NEW YORK

LIGHT YOUR JOB
With This New MOON



Type 12, 2 K W
MOON Turbo Generator

THIS new 2 KW MOON Turbo Generator makes an ideal lighting plant for construction work.

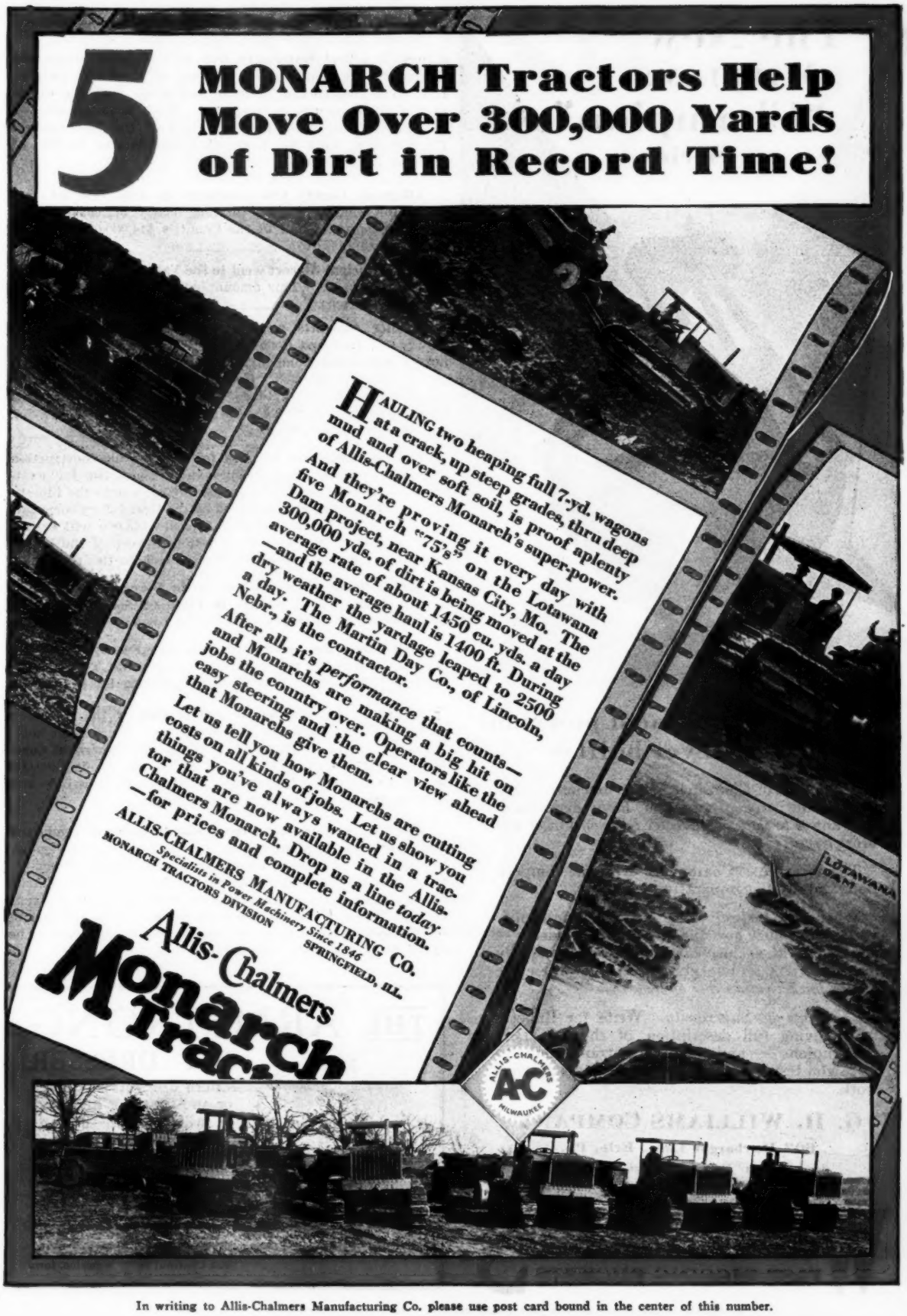
It is compact and rugged in design, has sufficient capacity for the average size job, and is remarkably smooth in operation.

Write for descriptive Bulletin No. 16-0.

THE MOON MFG. CO.
114-128 No. Jefferson St., Chicago

MOON LIGHTING OUTFITS

5 MONARCH Tractors Help Move Over 300,000 Yards of Dirt in Record Time!



HAULING two heaping full 7-yd. wagons at a crack, up steep grades, thru deep mud and over soft soil, is proof aplenty of Allis-Chalmers Monarch's super-power.

And they're proving it every day with five Monarch "75's" on the Lotawana Dam project, near Kansas City, Mo. The 300,000 yds. of dirt is being moved at the average rate of about 1450 cu. yds. a day —and the average haul is 1400 ft. During dry weather the yardage leaped to 2500 a day. The Martin Day Co., of Lincoln, Nebr., is the contractor.

After all, it's *performance* that counts— and Monarchs are making a big hit on jobs the country over. Operators like the easy steering and the clear view ahead that Monarchs give them.

Let us tell you how Monarchs are cutting costs on all kinds of jobs. Let us show you things you've always wanted in a tractor that are now available in the Allis-Chalmers Monarch. Drop us a line *today* —for prices and complete information.

ALLIS-CHALMERS MANUFACTURING CO.
Specialists in Power Machinery Since 1846
MONARCH TRACTORS DIVISION SPRINGFIELD, ILL.

Allis-Chalmers
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ALLIS-CHALMERS A-C MILWAUKEE

The New WILLIAMS "Champion" Series

The fastest and most powerful buckets ever built—

A new line of Clamshell "Super-buckets," that will outdig any others you have ever used. *Guaranteed to show you Greater Digging Power and More Speed.*

The WILLIAMS "Champions" welcome competition, and invite comparative tests!

When you inspect these new "Champions" you'll see at once how the many improvements—combined with exclusive features used successfully on past WILLIAMS buckets—have made these the *biggest bucket values ever offered.*

21 points of Superiority. Write for Bulletin "E," giving full description of the WILLIAMS "Champions"—and we'll make arrangements to have you test one of these super-buckets on your work.

G. H. WILLIAMS COMPANY

603 Haybarger Lane, Erie, Pa.

Branch Offices: New York, Pittsburgh, Chicago

WILLIAMS
FAST-DIGGING BUCKETS

SHOTS FROM THE FIRING LINE — Continued

system of inland waterways will be completed before the Marine Parade, which leaves the port of Pittsburgh October 12th. The construction of locks and dams, with the exception of minor details, is completed. Work is progressing on the construction of an auxiliary lock of the Monongahela River type at Lock 44, Louisville. Government dredges of all types are at work.

Allegheny County Commissioners on July 12th let contracts for county projects totaling nearly $7,000,000. The contracts represent half of the County's $14,000,000 improvement program.

The Municipal Airport went to the Vang Construction Company at $1,470,379. This amount will level enough land for a 540-acre airport.

Smaller contracts were awarded to J. W. Butler for Mowry-Gill Hall and Cochran Mill Road, $143,363. **Wilkinsburg Construction Company,** Babcock Boulevard elimination of two curves, $87,230; **Harrison Construction Company,** Bradford and Wexford Road, $22,230; **Harrison Construction Company,** Chartiers Bridge, sub and super structures, paving and approaches, $84,781.

The City Engineers will ask for bids for the construction of a semi-circular ramp to provide a short cut for westbound autoists in the Boulevard of the Allies onto the Liberty Bridge. This work was approved by the Grand Jury some few days ago. The ramp estimated to cost $143,000 will extend from a point in the Boulevard 200 feet west of the bridge intersection to the Forbes Street approach to the Bridge.

Dirt is flying for a new link in the Perry Highway from the city line to West View. **D. W. Challis & Sons,** contractors, expect to complete the new stretch of road by late this fall.

Nick Istock, the well-known Aliquippa, Pennsylvania, contractor, is making the earth move with his Type "1030" Bucyrus-Erie shovel. Bill White is operating the shovel.

Award of the contract for the grading of the extension to Bettis Flying Field and improvements to the present landing space was made July 20th to the **R. M. Netherland Company** of Pittsburgh. The project is to cost about $200,000 and to be completed by October 15, 1929. Bucyrus-Erie and Marion shovels will be used on this work.

The City Engineering Department have about completed their work on the plans for the Carson Street improvement. The first ordinance calls for the paving of Carson Street between Steuben and Corliss Streets. The cost of the Carson Street improvement from Smithfield Street to McKees Rocks borough line will run well over $1,000,000. It is planned to have a 56-foot street from end to end. No doubt bids will be asked for in the very near future.

THE ARMSTRONG BIT DRESSER

Churn drill bits sharpened on an Armstrong Bit Dresser will cut from 30% to 100% faster. This has already been proven in more than 150 quarries and open pit mines to their profit.

See P. & Q. Handbook, page 71, 1928
Keystone Metal Quarry Cat., page 160

ARMSTRONG MFG. CO.
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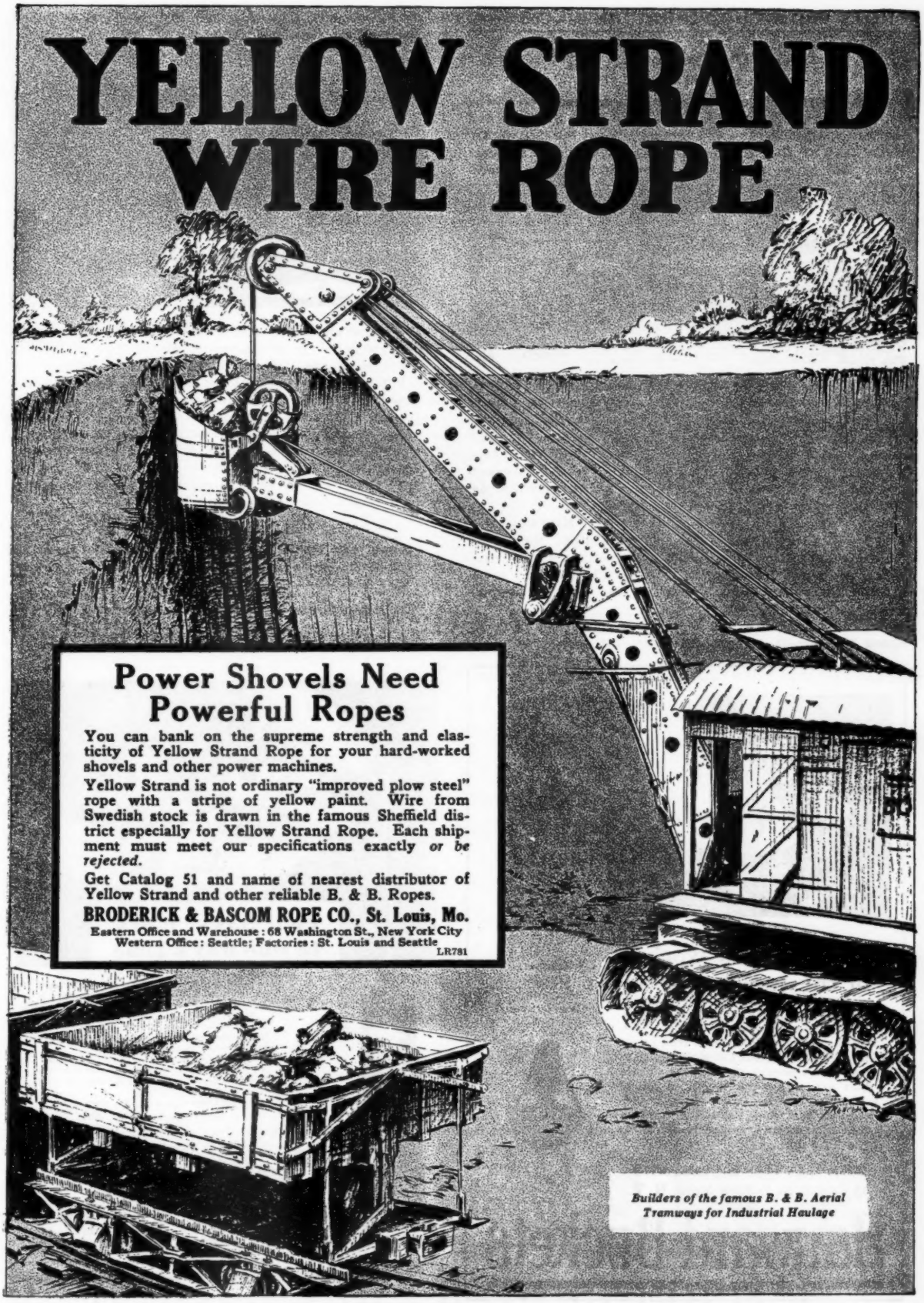
YELLOW STRAND WIRE ROPE



Power Shovels Need Powerful Ropes

You can bank on the supreme strength and elasticity of Yellow Strand Rope for your hard-worked shovels and other power machines.

Yellow Strand is not ordinary "improved plow steel" rope with a stripe of yellow paint. Wire from Swedish stock is drawn in the famous Sheffield district especially for Yellow Strand Rope. Each shipment must meet our specifications exactly *or be rejected.*

Get Catalog 51 and name of nearest distributor of Yellow Strand and other reliable B. & B. Ropes.

BRODERICK & BASCOM ROPE CO., St. Louis, Mo.

Eastern Office and Warehouse: 68 Washington St., New York City
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Builders of the famous B. & B. Aerial Tramways for Industrial Haulage

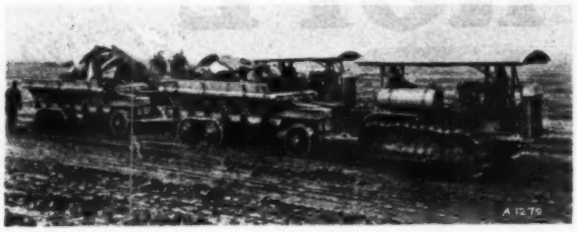
In writing to Broderick & Bascom Rope Co. please use post card bound in the center of this number.

SHOTS FROM THE FIRING LINE — Continued

Chicago Notes

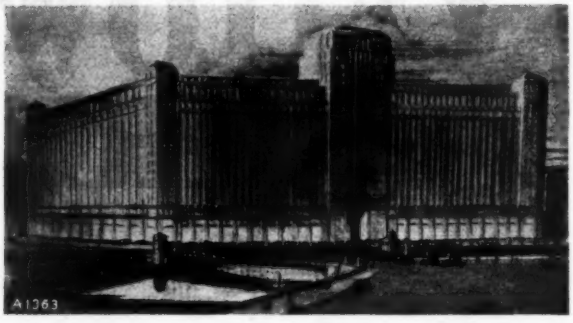
BY E. MESZAROS

Conrad Ottenhoff, a well-known Chicago contractor, who did the excavating work for the Soldiers Field Stadium, and the famous Tribune Tower, Chicago, is now working on Division "O" of the Sanitary District Sludge and Disposal Plant, 39th Street and Cicero Avenue at Stickney, Illinois.



The above picture shows a Caterpillar Sixty and two Streich "Creeper Wheel" seven-yard wagons which is part of the equipment they are using. They are also using on this job two Lorain 75-A gasoline shovels, one Northwest gasoline shovel, one Type "O" Thew steam shovel, four seven-yard Streich "Creeper Wheel" wagons, four seven-yard Western Crawler type cars, four La Plant-Choate trailers, seven model "60" Caterpillar Tractors, one "60" Hydraulic Buldozer, two ten-ton Holt Buldozer tractors and one "30" Hydraulic Buldozer. With this equipment in full operation, they move 7,000 cubic yards of dirt per day, consisting of solid clay which is dumped into position to form a bottom and rolled side for the sludge beds. Above the clay is a considerable quantity of black top soil.

Conrad Ottenhoff is the general supervisor and he is assisted by Herbert J. Schumann, Mr. Ottenhoff's two sons, Henry P. Ottenhoff, Superintendent, and George C. Ottenhoff, in charge of the timekeeping division.



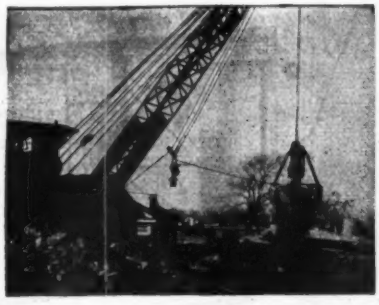
The above architect's sketch shows the new Merchandise Mart located at Wells Street and the river. Two blocks long, twenty-three stories high, with twice the floor area of any other building in the world, this great structure is now climbing rapidly skyward. W. J. Newman Company handled the excavation, using their Bucyrus-Erie equipment on this work, and the construction is being handled by John Griffiths & Son, builders, with Bruce Gordon as general superintendent. Wet concrete and dry aggregate is distributed by fifty-five Barber-Greene belt conveyors in the most flexible system ever used for such a job.

Sign in Restaurant

Patrons will please refrain from bringing liquor on the premises in order to save embarrassment to other patrons who have been unable to secure any. — **Judge.**

"Bob's been drunk every night since I refused to marry him."

"Why don't you tell him to stop celebrating?"



—HAYCO—

Builders of Buckets:
Clam Shell
Orange Peel
Drag Line
Electric Motor

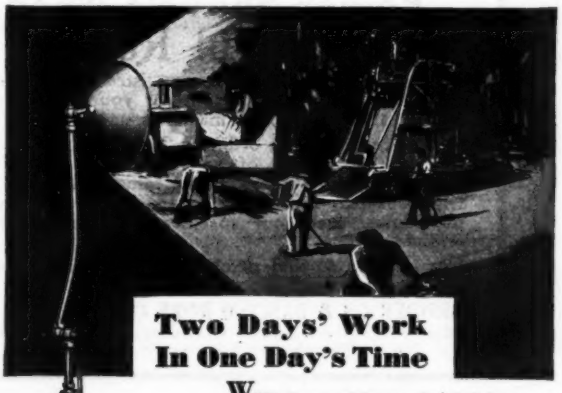
Machinery:
Dredging
Excavating
Coal Handling

Makes easy work of the toughest jobs

HAYWARD Orange Peel Buckets have ample power to crunch their way through hard-packed or rocky soil. They are strongly built to withstand the most severe shocks and strains. Their rapid action assures speedy digging; gets work done on time. Bulletin 655 describes and illustrates the various types of Hayward Orange Peel Buckets. Send for a copy.

THE HAYWARD COMPANY
56 Church St. New York, N. Y.

Hayward Buckets



Two Days' Work In One Day's Time

WHEN days grow shorter—when dark hours crowd out productive operation—Speed up your Job with a night shift.

Carbic Flood Lights are powerful, portable units that supply clear white perfectly diffused light. They are rugged pieces of equipment built to serve you night after night.

Carbic Light requires no costly installation. Any inexperienced workman can charge it in a few minutes—and it is ready for hours of continuous service.

Carbic Light costs only a few cents an hour.

Extend Your Working Day With
CARBIC LIGHT

OXWELD ACETYLENE COMPANY
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Without obligation, I would like to have additional information on Carbic Lights.
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Carbic is manufactured by the Union Carbide Sales Company through its numerous sales offices in the United States and is sold by jobbers everywhere.

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Can Your Team Outfit Work in Such Sand?

Here is an operating view showing one of A. F. Hartigan's 7-yard Western Crawler dump wagons which partly explains why these huge wagons are revolutionizing the dirt-moving industry. Teams and round wheel wagons could not work in such sand.

"We consider that our four direct-hitch Western Crawler wagons do the work of 30 1½-yard wagons," said Herbert Griffis of Griffis Brothers Construction Company, who are building a highway in Minnesota.

If you are not using Western Crawler wagons, how are you going to compete with such outfits, that can work night and day, can pull big loads where other type of wagons could not move, and operate in trains of two where hauling conditions are good?

Western Crawler dump wagons are made in three sizes, with direct hitch or front trucks. Send for our Bulletin 29-AK that gives full information.

Western Wheeled Scraper Company
Aurora, Illinois, U. S. A.

WESTERN

DUMP CARS AND GRADING EQUIPMENT

In writing to Western Wheeled Scraper Co. please use post card bound in the center of this number.

SHOTS FROM THE FIRING LINE — Continued

Wisconsin Notes

BY E. P. DOYLE

Wussow Brothers, Milwaukee, have started excavating for the large Milwaukee County Court House at the corner of 8th and Wells, and are moving 1500 yards per day with their two Gas + Air machines, one of which is shown above, (J. Nimmergood and F. Weink operating, firemen, R. Wussow and F. Nicholson). They load the clay to twenty-five Mack trucks which move it to Maitland Airport where it is used for filling. The excavation is one of the largest of its kind in Milwaukee, the depth being 28 feet, length 900 feet, width 300 feet. The new court house will cover two blocks, extending over Cedar Street, where an arch will allow traffic to pass through the center of the building. A. J. Wussow is General Manager, while A. D. and E. J. Wussow are doing the superintending on the job, with Fred Fisher as foreman.

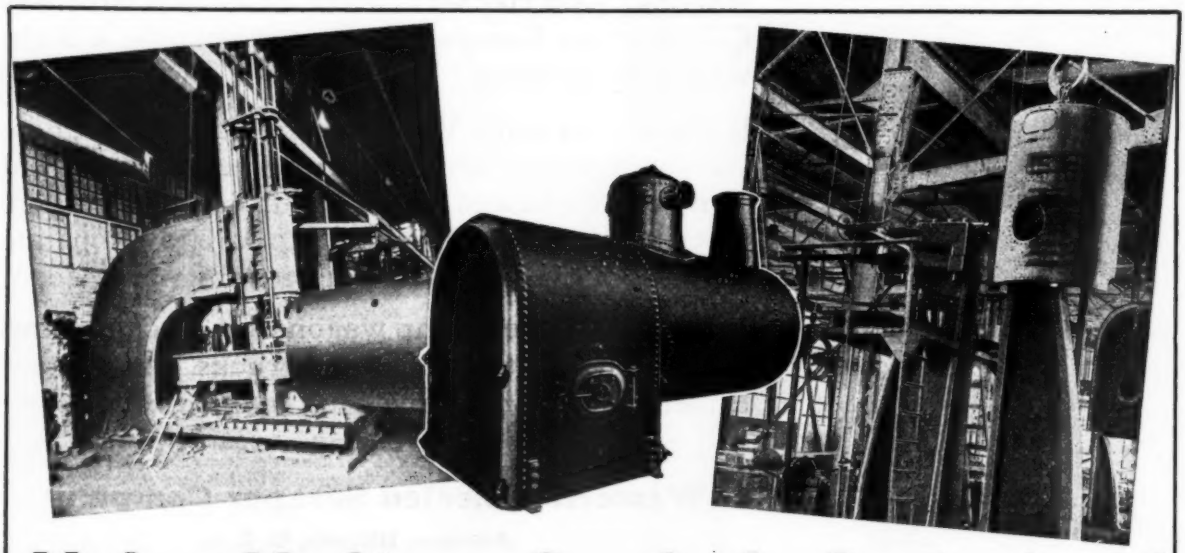
Iowa Notes

Callahan and Walker Company of Omaha, Nebraska, are using their Bucyrus-Erie D-2 shown above on their twelve-mile road job on Iowa Highway Number 27, east of the new Blair Bridge across the Missouri River. Excavation consists of approximately 480,000 cubic yards, and will be handled by this D-2 and a Monighan dragline which was still moving in at the time of our visit. On the section where the photograph was taken the D-2 was working in a burrow alongside the grade just east of the new bridge and casting directly to the fill. The new road will make a cut-off on the Lincoln Highway, taking heavy traffic out of Omaha and Council Bluffs and save approximately twenty-eight miles. A. D. Cummings, recently back from operating a D-2 on one of the Mexican Government Irrigation jobs, is pulling the levers on the D-2, while John Kule is acting as foreman.

St. Louis Notes

BY A. J. KOENIG

The improvement program of the Missouri Pacific Railroad continues with the letting, on August 7th, of the contracts for Sections L and M of the second main track work between Lake Hill and Eureka, Missouri. Winston Bros. Co., Minneapolis, Minnesota, were the successful bidders on Section L, which entails approximately 350,000 cubic yards of



Modern Machinery Speeds the Production of
JOHNSTON BOILERS

For sixty-five years Johnston Brothers have specialized in boilers for contractors equipment. In the evolution from iron to steel, from hand built to machine built, from unit building to mass production, this organization pioneered. Welding equipment was first installed in the Johnston plant more than twenty years ago.

Today experienced workmen who have grown up with the Johnston organization and modern boiler-making machinery, speed the production of Johnston Boilers. You can bring your boiler problems to Johnston Brothers confident that men with years of experience will build your boilers and that you will get delivery when you want it.

JOHNSTON BROS., Inc., FERRYSBURG, MICH.

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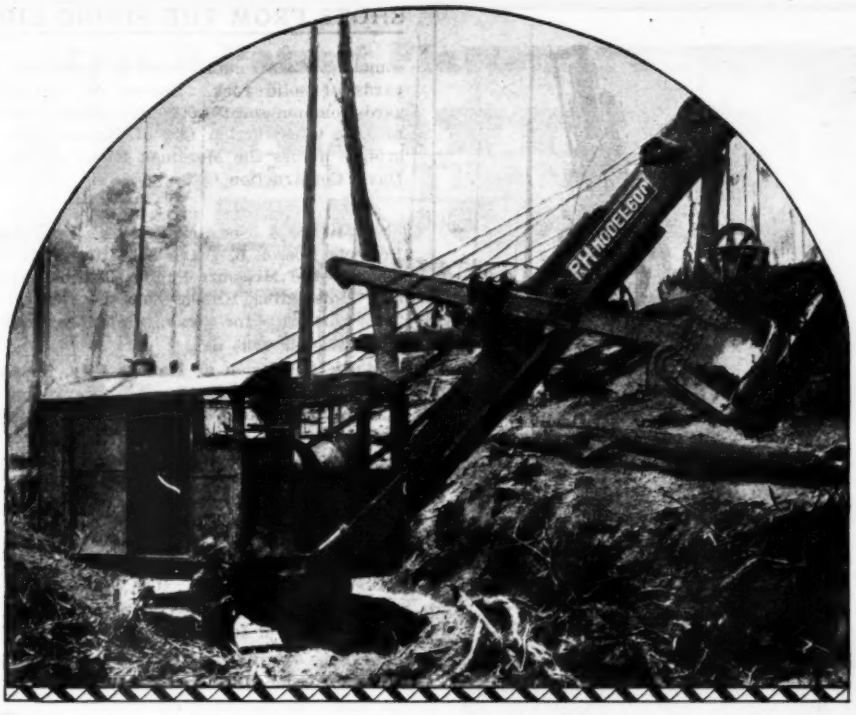


P&H Shovel..powered with an Atlas Imperial Diesel . . in the service of The Pacific Lumber Co., Scotia, Calif.

HERE'S THE WAY DIRT-MOVERS ARE SCRAPING RED OFF THE BOOKS

Fuel costs of $3 a day.. against $20.. and the elimination of $5 a day pump and water line maintenance cost.. are the savings over steam being made with an excavator powered with an Atlas Imperial Diesel. . .

75% to 90% less fuel costs . . with 10% to 15% more yardage .. are some of the advantages you get over gasoline power. . .

The cheap, low-grade fuel oil that you use in an Atlas Imperial Diesel, costs only ⅓ to ¼ as much as gasoline .. and you use only ½ to ⅓ as much. . .

Absence of water troubles .. higher average daily yardage .. instant starting and stopping . . from stone cold to full load in 10 seconds . . are a few of the advantages over steam. . .

You should see the yardage that Atlas Imperial-powered excavators turn in! . . the harder the going, the more they like it. . .

Under heavy load, and consequent lower speed, where the gas engine normally stalls .. the Atlas Imperial digs in and lugs. As the engine is thus pulled down in speed, its lugging power (torque) uniquely increases . . because, with its common rail fuel system, proper atomization is maintained in the Atlas Imperial over the entire range of speeds. . .

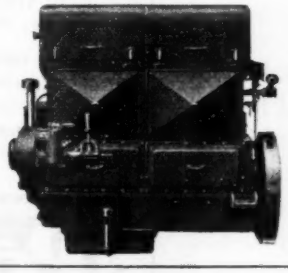
Continuously . . day-in and day-out . . from shift to shift . . the Atlas Imperial stands the gaff .. marine diesels built in 1916 are still in daily service . . with no signs of giving in. . .

For more information . . mail the coupon.

STANDARD EQUIPMENT

in Bucyrus-Erie Excavators : P & H (Harnischfeger) Excavators : Link-Belt Excavators : Thew Excavators : Plymouth Locomotives : Lidgerwood Logging Equipment.

Atlas Imperial manufactures a full line of Diesels ranging from 20 H P to 500 H P . . for all marine and industrial uses.



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Atlas Imperial Diesel Engine Co., 2867 Glascock St., Oakland, California: Mail information on Atlas Imperial Full Diesels.

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In writing to Atlas Imperial Diesel Engine Co. please use post card bound in the center of this number.

"A Better Digger Than We Expected!"

"And I have been following the Clamshell Bucket game for Fifteen years."

That is what one Contractor said about the New Multi-Power Bucket, and he had reasons to say this. The digging was in the bottom of the stream bed, consisting of muck, blue clay and gravel, and the bucket came up with a full load every time. The photo above tells the story.

This same Contractor claimed he was digging 50 yards per day more with the Multi-Power bucket than with another bucket that he had on the crane at first.

Send for Prices

Erie Steel Construction Co.
Erie Box 8 South Erie Station **Penna.**

SHOTS FROM THE FIRING LINE — Continued

common, 562,000 cubic yards of loose rock and 148,000 cubic yards of solid rock. Section M, embracing 212,000 cubic yards common and 181,000 cubic yards solid rock, was awarded to List Construction Co. of Kansas City. The two large bridges across the Meramac River will be built by Frasier-Davis Construction Co.

J. Kries & Sons, Knoxville, Tennessee, were awarded Projects Nos. 4, 6, 7 and 8 of the grade revision and alignment of the Missouri Pacific Railroad between Osawatomie and Hoisington, Kansas, on the Central Kansas Division. This work calls for excavating approximately 1,223,000 yards of earth and rock.

Cook & O'Brien of Kansas City, Missouri, have contract for Project No. 5 of the above revision work at Belleville, Kansas, calling for concrete trestles and bridge substructures, timber trestles, culverts, reinforced concrete and pipe, and 250,000 cubic yards of earth and rock excavation.

Stewart-Jones Co., Rock Hill, South Carolina, have six steam shovels, sixty dump cars, six locomotives, concrete mixers, spreaders, wagons, etc., idle. Looking for a big dirt-moving job.

The Harrison Engineering Company of Lone Tree, Missouri, are using their Bucyrus-Erie Type 1030 clamshell for handling material as shown in the accompanying illustration.

Stroman & Kidder, Cofeen, Illinois, have 5,000 cubic yards of channel excavation suitable for slips or fresnos near Cofeen, Illinois, with transportation, that they would like to sublet. Anyone interested should get in touch with Howard L. Kidder at Cofeen.

T. P. Newland, Toledo, Illinois, has a shovel-dragline and Iron Mules idle.

C. H. Atkinson Paving Co., Bevier, Missouri, have 26,000 yards of earth to move at Bethany, Missouri, and need an outfit at once.

W. L. Dunston, Marion, Illinois, has a shovel and a two-machine outfit idle.

Style B Patent Flattened Strand

"HERCULES"

RED-STRAND

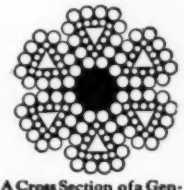
REG. U.S. PAT. OFF.

WIRE ROPE

Has Many Exclusive Points of Advantage

This wire rope is the combination of extra high grade material with a construction that provides specific advantages unequalled by any other type of wire rope manufactured.

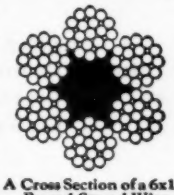
Some of the chief features of this construction are: (1) Grade for grade it is stronger than any Round Strand construction, because the shape of the strands permits the use of more metal. Note the small hemp center. (2) The keystone shape of each strand offers greater resistance to crushing. (3) The outer wires in each strand conform to a circle, consequently surface wear is distributed over a greater number of wires. This smooth outer surface also reduces wear in grooves of drums and sheaves. (4) This rope gives a higher factor of safety, not only because of its greater strength, but also because its flatter surface between the strands themselves minimizes the danger of the strands cutting each other.



A Cross Section of a Genuine Style B Patent Flattened Strand Wire Rope

Style B Patent Flattened Strand Wire Rope is made up of 6 strands of 25 wires each, but all 6x25 wire ropes are not of the genuine Patent Flattened Strand construction. Some 6x19 Round Strand ropes, in addition to the usual 19 wires, also have 6 small "filler" wires in each strand to make it more compact. These "filler" wires, however, do not increase the rope's strength.

When you are offered 6x25 wire rope, it will pay you to find out whether it is a "filler wire" construction or the genuine Patent Flattened Strand construction. We particularly recommend Style B Patent Flattened Strand "HERCULES" (Red-Strand) Wire Rope for use on heavy duty cranes, clam shell buckets, dredges, excavators, mine hoists and shovels.



A Cross Section of a 6x19 Round Strand Wire Rope Filler Wire Construction

If you are not entirely satisfied with the amount of service you are now getting for each wire rope dollar that you spend, we would like to have you give this remarkable wire rope a chance to show you what it can do.

Made Only by **A. LESCHEN & SONS ROPE CO.** Established 1857

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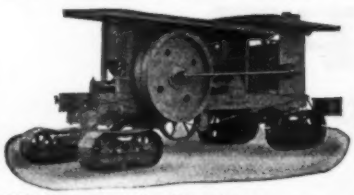
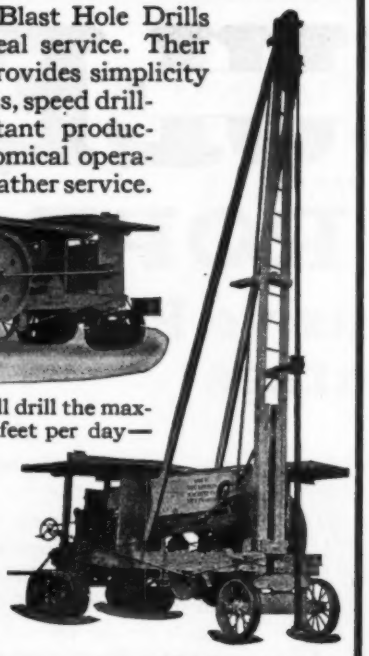
New York **Chicago** **Denver** **San Francisco**

ALWAYS DEPENDABLE

"CLIPPER" Blast Hole Drills are built for real service. Their construction provides simplicity with ruggedness, speed drilling with constant production, and economical operation with all weather service.





"CLIPPERS" will drill the maximum number of feet per day—*per month* and PER YEAR in your own rock strata whether it be soft or hard.

Let us tell you how "CLIPPER" Blast Hole Drills will cut your drilling costs.

THE LOOMIS MACHINE CO.
(Established 1842) K Street, Tiffin, Ohio

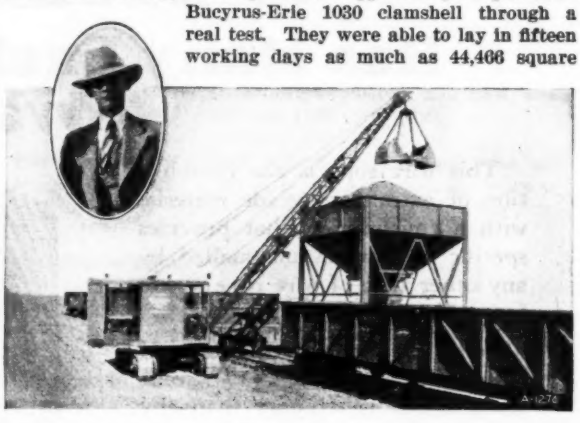
SHOTS FROM THE FIRING LINE — Continued

Billhorn-Bowers & Peters started on their rip-rap and revetment work on the Missouri River near St. Joseph, Missouri. Revetments will be built both above and below Lake Contrary.

C. G. Kershaw Construction Co., Birmingham, Alabama, on their bid of $64,000 were awarded contract for widening the Memphis approach of the Harahan Bridge.

Texas Notes

The Zempter Construction Company, Amarillo, Texas, building a stretch of twenty-five miles of concrete highway in Carson County, recently had an opportunity to put their Bucyrus-Erie 1030 clamshell through a real test. They were able to lay in fifteen working days as much as 44,466 square



yards of concrete, equal to 22,233 lineal feet of roadway. This required the handling of fourteen cars of gravel and

GREAT LAKES
DREDGE & DOCK COMPANY
RIVER AND HARBOR IMPROVEMENTS
SOUTH CHICAGO, ILLINOIS

May 20th 1929

Mr. Thos. L. Gatke,
228 N. LaSalle Street,
Chicago, Illinois.

Dear Sir:

It is a pleasure to report upon the Moulded Swinging Frictions which you made up for our 30-B Bucyrus Diesel Shovel.

These Frictions were installed the early part of January 1929, and the Shovel placed into service immediately, and they have lived up to every claim you made for them. We have not experienced the slightest difficulty in swinging and the operation of the shovel has been speeded up tremendously. From the appearance of these frictions, and from our experience with Asbesgraphite on all of our other equipment, we believe these frictions will last years.

Thanking you for the personal interest shown and the effort you have made in solving this problem for us, we are

Yours very truly,
GREAT LAKES DREDGE & DOCK COMPANY
GAW/GER BY G. A. WIDSTRAND

"—will last for years"

YOU, too, can solve friction troubles permanently by using *Asbesgraphite* on shovels, dredges, draglines, cranes, hoists, pavers, trucks, etc. This GATKE product has proved its ability to give longer life, trouble-free service, and ability to speed up operation, because of better and smoother control.

Asbesgraphite is self-lubricating, non-scoring friction material unaffected by heat, cold or moisture.

Satisfaction Guaranteed — Order Today.

ASBESGRAPHITE
ASBESTOS COMPOSITION

Remember—It is not Asbesgraphite unless it is marked "GATKE"

THOMOS L. GATKE
Manufacturer
Chicago Office: Builders Building
Factory: Winona Lake, Indiana
Address inquiries to our Chicago office

ALL SIZES CARRIED IN STOCK FOR

Bucyrus-Erie, Monighan, Osgood, Northwest, Byers, Ohio Locomotive, Industrial, P. & H., Keystone Driller, Massillon, Thew, Erie, Page, Moore Speedcrane, Link Belt, Marion, Bucyrus, Allis-Chalmers, Nordberg, Wellman-Seaver-Morgan, Ottumwa Iron, Lidgerwood, Mundy, Flory, Mead-Morrison, Orr & Sembower, Clyde, American, Lambert, Thomas Elevator And Others.

Low Cost Grading

—on anything from a skimming cut to a 4-foot bank

—without preliminary plowing

—and in anything that will yield to pick and shovel

—earth, sand, clay, gumbo, old macadam, top soil, etc.

Airports for instance!

You can shallow-grade at much lower cost with the new HAISS EXCAVATOR. It is a continuous digging machine that makes a cut 8 feet wide in a single pass—and will excavate up to 2 yards a minute depending on the depth of cut. To appreciate this machine, what it can do and what you can save by using it, you ought to write us—

"Send along your Haiss Excavator performance book"

George Haiss Mfg. Co., Inc.
144th Street and Park Ave. New York City

HAISS "EXCAVATOR"

In writing to Geo. Haiss Mfg. Co., Inc., please use post card bound in the center of this number.

SHOTS FROM THE FIRING LINE — Continued

eight cars of sand, as well as 900 barrels of cement per day. The photo shows their 1030 loading into an Erie bin.

In the insert operator E. Whittington is shown, and he's mighty proud of his 1030 because it has enabled him to handle every bucket of the material with no delays.

The Zempter Construction Company believes this to be a record for road building done in this length of time.

How about it, readers. — The Editor.

San Francisco and Vicinity

BY J. H. SACKETT

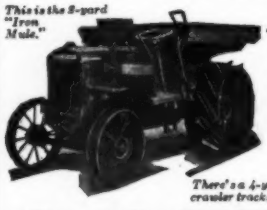
Twenty sand, rock and gravel companies, with resources of more than $20,000,000, and operating twenty producing plants, as well as twenty-five distributing plants, were merged recently under the name of **Pacific Coast Aggregates, Inc.,** to form what is said to be the largest sand, rock and gravel company in the world.

The following well-known firms are included in the merger: Acme Gravel Company, Associated Gravel Company, Ameriver Sand Company, American River Sand & Gravel Company, Bay Development Company, T. I. Butler Company, Coast Rock & Gravel Company, Golden Gate-Atlas Material Company, California Rock Company, G. & M. Gravel Company, Piedra Rock Company, Solo Sand Company, California Building Material Company, Pratt Building Material Company, Pratt Rock & Gravel Company, Rhodes-Jamieson Company, River Sand & Gravel Company, Santa Clara Gravel Company and Vulcan Rock Company.

Norman B. Livermore, President of the Coast Rock & Gravel Company, will be President of the new conceern, and George G. Jamieson, President of Rhodes-Jamieson Company of Oakland, and Frank W. Erlin of the Coast Rock & Gravel

Put An "IRON MULE" on the Job

It Licks Trucks and Teams



This is the 2-yard "Iron Mule."

"IRON MULES" for years have made phenomenal profits for dirt-moving contractors. There are 2 sizes — the 4-yard with power hoist dump and crawler tracks, and the 2-yard with gravity dump. These sensational dirt haulers will get where trucks and teams can't go. Write for illustrated broadside that fully describes them.

There's a 4-yard with crawler tracks also.

Dump Bodies Too

HUGHES-KEENAN Dump Bodies for all makes of light trucks are famous wherever dump bodies are used. Made in 1 and 1½ yard sizes, equipped with gravity dump, underbody hand hoist or power hoist. Write for descriptive folder.

THE HUGHES-KEENAN CO. Mansfield, Ohio

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The **KOENIG LABOR AGENCIES**

Established 1875

ST. LOUIS
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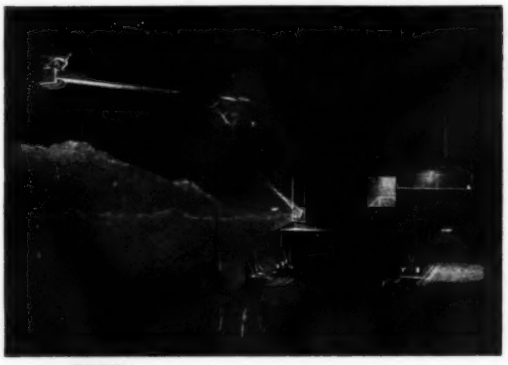
Help of All Kinds Furnished Free

Double Your Profits With a Night Shift



THERE is a tacit understanding on many excavating projects that night shift production cannot be expected to equal that of the day crew. Yet on many a well-organized job the night crews turn out equal or larger yardage than the day crew. And why shouldn't they?

BUCYRUS-ERIE COMPANY can supply for immediate shipment packings of all kinds, brake lining of all types, wire rope, electric light plants, hoisting chain, rail clamps, power transmission cables and railway crane equipment.

The handicaps of interfering labor operations, heavy blasting, traffic interruptions and sultry heat are missing. Balanced against these is the difficulty of properly lighting the job for fast operating.

And this difficulty is easily overcome.

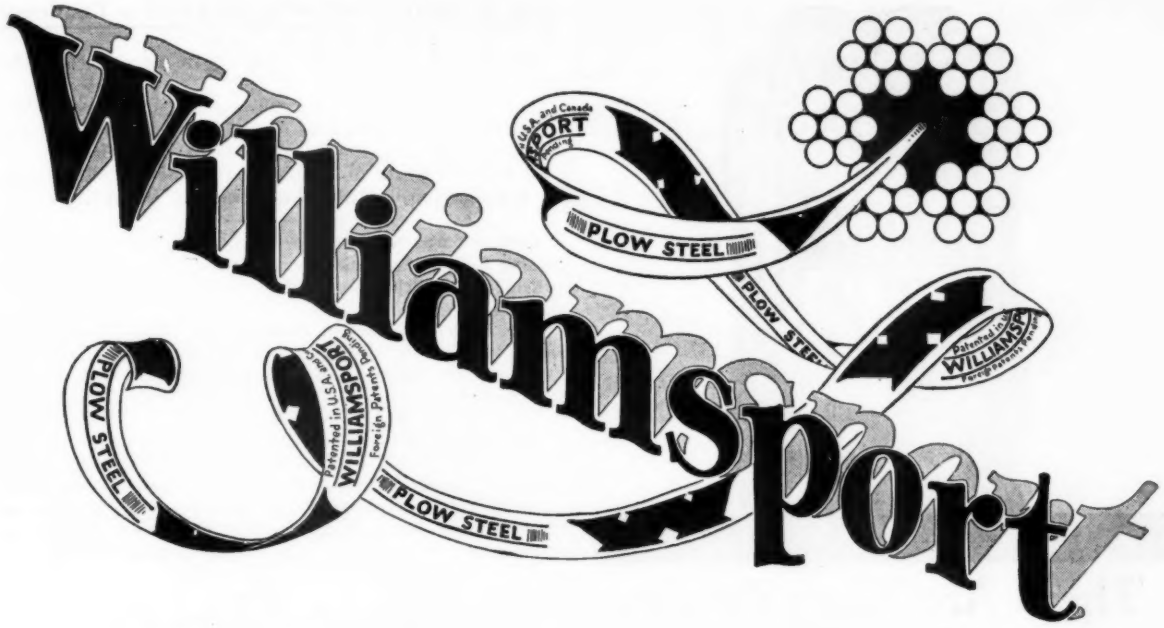
For your steam, gasoline, or Diesel engine-driven excavating machine, Bucyrus-Erie has an electric light plant that will give you ample light for digging and loading and give it to you in exactly the right place.

Let us tell you about this sturdy plant —you can figure out for yourself the profits it will help you make. Remember that you can forget such items as tax, bonding, bidding, interest and office expense — even depreciation for one shift is practically the same as for day and night operation.

BUCYRUS-ERIE COMPANY

BUCYRUS ERIE

SPECIALTY DEPARTMENT
South Milwaukee,
Wisconsin



The ACCEPTED STANDARD in

WIRE ROPE QUALITY

In the use of Wire Rope it is important to KNOW FOR A CERTAINTY the quality of Wire Rope put into service.

Williamsport standard of Quality, due to their superior process of manufacture and competitive tests has caused prominent engineers to accept it as ***Standard.***

The Telfax Tape System of grade marking—woven into the core of each grade of rope—factory certification—is absolute proof of tensile strength, a protection worth more than the price of the rope.

Send for literature and prices.

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SHOTS FROM THE FIRING LINE — Continued

Company are to be the vice-presidents of the new consolidation.

The area to be served contains one-half of the population of California, and represents one of the fastest growing sections in the United States. It extends from Oroville and Folsom on the North to Monterey on the South, and includes the great metropolitan San Francisco Bay District.

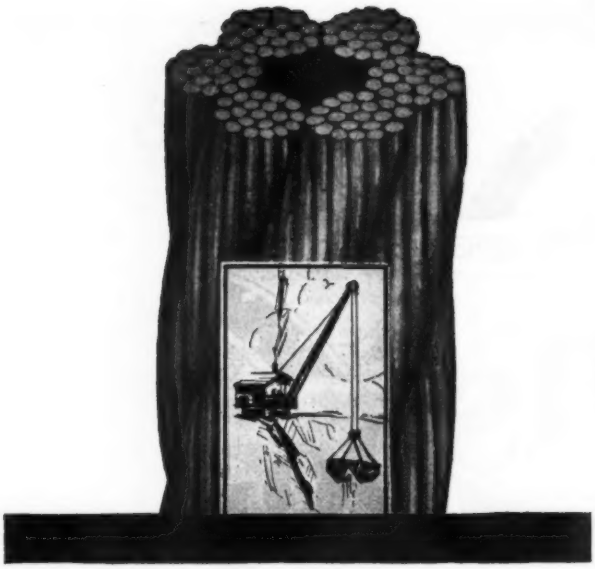
Contract was awarded to M. S. Ross, Los Angeles, for grading 5.17 miles of Glendora Mountain Road, in the east fork of San Gabriel Canyon for the County of Los Angeles.

The Utah Construction Company has been awarded the contract for constructing Deadwood Dam, concrete arch type with upstream radius, 160 feet high and 700 feet long on crest, located 25 miles east of Cascade, Idaho.

The Shell Oil Company, who purchased one of the first Bucyrus-Erie Diesel + Air shovels to be put to work in the San Francisco district, recently installed their second Diesel + Air shovel. The machines are used in leveling hills on the Shell Oil property at Martinez and for handling materials around the plant and tank farm. F. J. McMahon is superintendent of outside construction.

Ted Thorenson, who is handling the levers on a Bucyrus-Erie Gas + Air shovel for Granfield, Farrar and Carlin of San Francisco, has moved 62,000 yards with this machine in single shifts of 8 hours during the last two months. The machine is on a state highway job near San Rafael and the material is largely rock which is drilled and shot up.

C. R. Adams of Oakland has finished two-thirds of an eleven-mile grading job near Nevada City and expects to finish the shovel work in October.



There Are Many Grades *of* Wire Rope

but it's the Right Grade for the Job that Counts!

Solve your Wire Rope problems by using—

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STEEL & WIRE COMPANY

WIRE ROPE

American Steel & Wire Company

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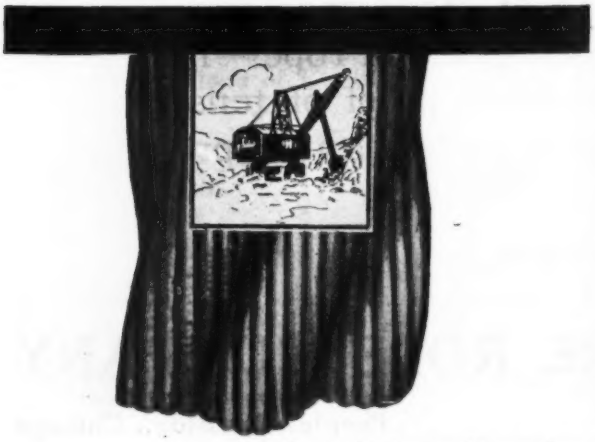
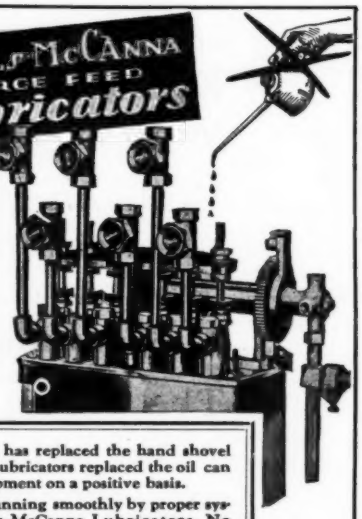


HILLS-McCANNA FORCE FEED *Lubricators*



MORE Positive than 40 OIL CANS

Just as the steam shovel has replaced the hand shovel so have Hills-McCanna Lubricators replaced the oil can as a means of oiling equipment on a positive basis.

Keep your equipment running smoothly by proper systematic oiling with Hills-McCanna Lubricators. No Guess work—sight feeds show oil leaving pump and at delivery point. Save valuable operator's time as well as neglect

Made in types from 1 to 60 feeds for all classes of contractors' equipment.

Our Engineering Service is free.

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THE MOST COMPLETE SERIES OF ALLOYS FOR INDUSTRIAL USE
FORCE-FEED LUBRICATORS - PROPORTIONING PUMPS - TANK CAR VALVES

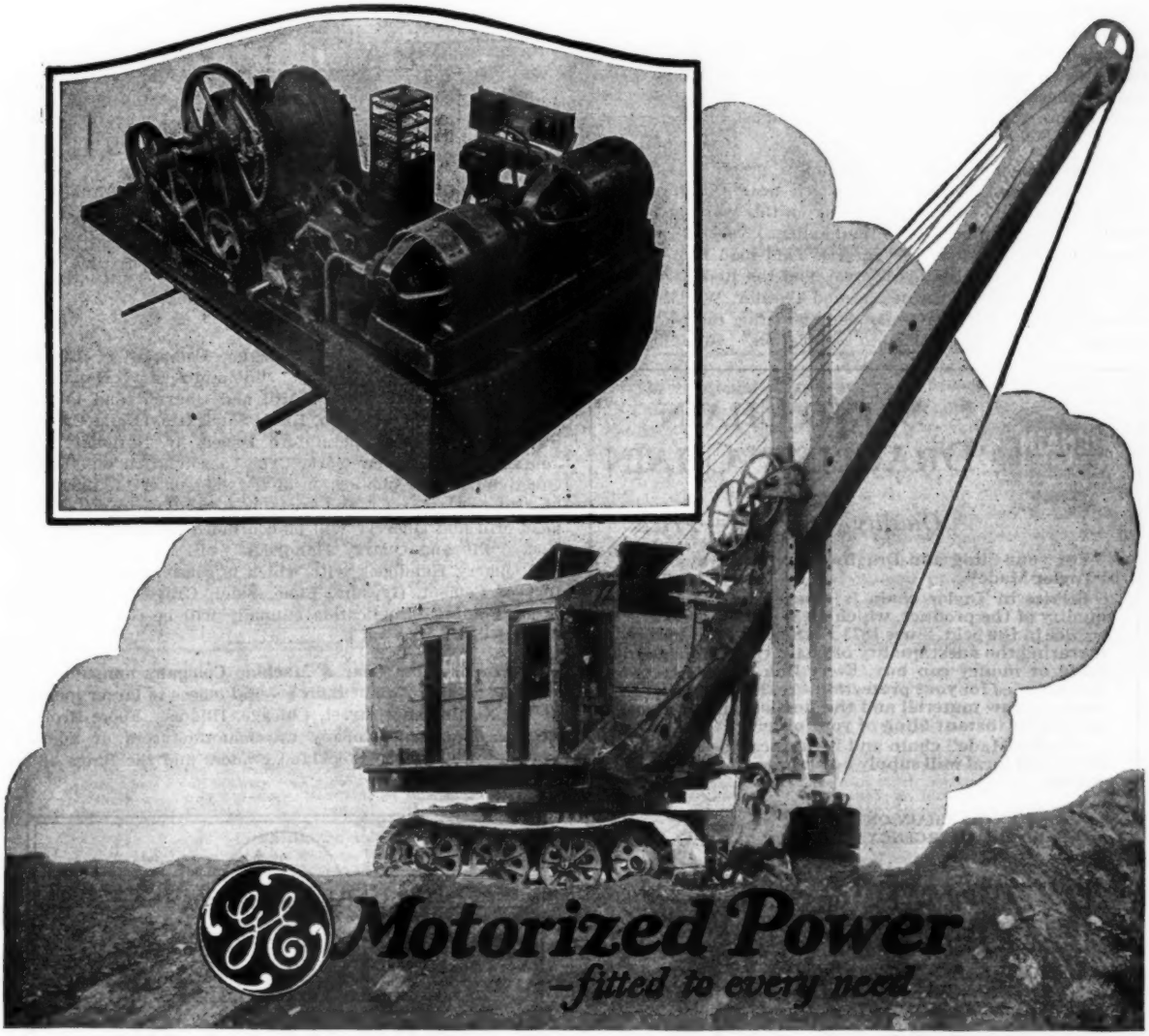
Behind the Bucket

What's behind the bucket of your shovel as it chews its way into an excavating job?

There—back of the bucket—at the heart of the shovel—that's where you want unfailing reliability.

And you'll find it there if your machine is G-E equipped—with G-E Motorized Power.

Unfailing reliability, dogged strength, close control, simplified design, and economy of operation—that's G-E Motorized Power, and that's why it is almost invariably specified for electric shovels.



200-218

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

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SHOTS FROM THE FIRING LINE — Continued

Ray Peterson, Superintendent for R. G. Le Tourneau of Stockton, reports that he is averaging 3000 yards per day of two eleven-hour shifts on the northern approach to the new Southern Pacific bridge across Carquing Straits near Benicia, California. A 2-yard 50-B Bucyrus-Erie Diesel shovel is loading into 10-yard wagons which Le Tourneau manufactures himself. These are hauled by Caterpillar "60" tractors. The high run to date on this job was 100 wagons in 5 hours. On the southern approach George Pollock of Sacramento has moved more than 250,000 yards up to August first.

Charles Harlowe, Jr. of Oakland is practically through with a six-mile Federal highway job near Chester. Jack Welsh of Oakland sublet the grading on this work and W. K. Walker of San Francisco did the hauling. Noble Brothers of Marysville are handling the gravel. This road from Chester to Mineral will be an all-year road, and the Red River Lumber Company which operates around Chester, Westwood and Susanville has been very generous in assisting the contractors to carry this work through to completion. Adjoining Harlowe's job the Red River Lumber Company has a 2-yard Bucyrus-Erie 50-B Diesel shovel working for Payson Brothers who sublet this four and a half mile piece from C. R. Johnson of Portland, Oregon.

H. W. Rohl Company of Los Angeles recently were awarded an earth dam contract for the Chenery Reservoir in Contra Costa County. The contract calls for moving 600,000 yards of dirt in four months.

Plans and specifications are being completed by Consulting Engineer, S. H. Norris, Oroville, Butte County, and call for bids will be issued soon by the El Dorado Irrigation District, Placerville, Eldorado County, for the construction of a hydraulic fill dam on Weber Creek for the District. The work will involve in the main:

800,000 cubic yards hydraulic fill. Dam is to be approximately 160 feet high. Estimated cost of the structure is $435,000. Bids for purchase of bonds of the District will be opened soon, and when bonds are sold, bids for the dam will be advertised.

TRADE NOTES

Recent announcement has been made of the removal of the **Philadelphia office of the Bucyrus-Erie Company** to their new quarters. Their new address is 821 Commercial Trust Building.

The Continental Motors Corporation recently announced that they had established their Pacific Coast headquarters at 1855 Industrial Street, Los Angeles, California. Ray Long will be manager of this western branch, and will take charge of the entire Continental line which includes automotive, industrial and aviation engines.

The Complete Service Publishing Company of Chicago, publisher of "Pit and Quarry," "Pit and Quarry Handbook," etc., has purchased "Cement-Mill and Quarry" and the "Directory of Cement, Gypsum, Lime, Sand, Gravel and Crushed-Stone Plants," both heretofore issued by National Trade Journals, Inc., of New York. The consolidation will become effective with the publication of the September 11, 1929, issue of "Pit and Quarry," and certain editorial features of "Cement-Mill and Quarry" will be continued after the consolidation. "Pit and Quarry Handbook" will be known as "Pit and Quarry Handbook with which is consolidated the Directory of Cement, Gypsum, Lime, Sand, Gravel and Crushed-Stone Plants." Publication annually will be continued.

Foote Brothers Gear & Machine Company announces the removal on May 25th of their general offices to larger quarters at 111 North Canal Street, Chicago, Illinois. Foote Brothers Gear & Machine Company are manufacturers of machine gears as well as the Stockland graders and the Bates "Steel Mule."

CHAIN THE STRONG LINK OF INDUSTRY THE CHAIN INSTITUTE

SLING CHAIN
DRAGLINE CHAIN

Right as to
Quality — Service — Price

For your Sling and Dragline Chains always order "Taylor Made".

Service in Taylor chain is assured by the higher quality of the product, which gives you longer, surer service in the field. Since 1873 Taylor has been manufacturing the finest quality of chain that science can build or money can buy. Every link is proof tested and branded for your protection. At the factory large stocks of raw material and the finished material are carried for instant filing of your orders.

"Taylor Made" chain and fittings can be obtained from your local mill supply house or local mill supply jobber.

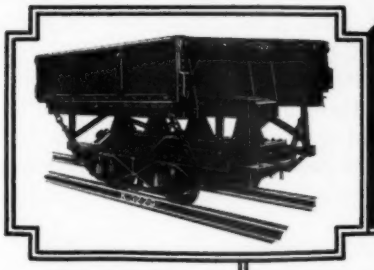
KEEP EXTRA CHAIN ON HAND FOR EMERGENCY

TAYLOR MADE
HAND-ELECTRIC AND MACHINE WELDED CHAIN

S. G. TAYLOR CHAIN CO.
Established 1873 P. O. Box 117-B. Hammond, Indiana

THE SANDERSON CYCLONE DRILL CO., ORRVILLE, OHIO

DRILLS
and drill tools for every kind of Big Blast Hole Drilling
Catalog Mailed on Request



KOPPEL

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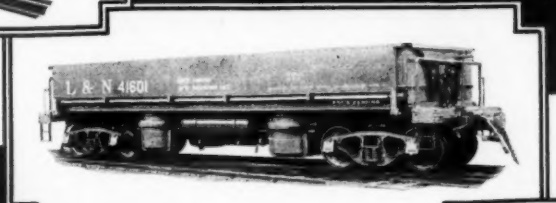

Quick, economical, haulage is possible only with well built, dependable cars.

Koppel cars, of every type, are designed and built to stand hard, rough, usage—and give long service at minimum maintenance cost.

We build a large variety of cars to meet practically every haulage requirement.

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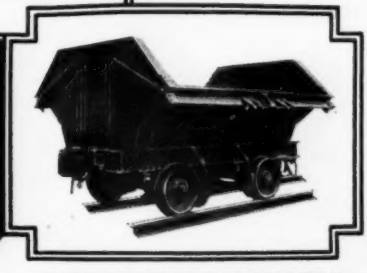

BORCHERT-INGERSOLL
INCORPORATED
2360 University Ave. St. Paul, Minnesota
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BOOK REVIEWS

About September 1st, the S. G. Taylor Chain Company, Hammond, Indiana, will have ready for distribution a new catalog which has eliminated a great many items, in line with the Department of Commerce Simplified Practice Recommendation No. 100, and is the first catalog to give definite information relative to Sling Chains, as to the diameter and dimension of joiner and end links. A copy of this will be sent free upon request. Please mention **The Excavating Engineer** in writing.

The National Crushed Stone Association, Merchandise Building, Washington, D. C., have just published the proceedings of the Twelfth Annual Convention of this association which was held at Cleveland, Ohio, January 21st to 24th, 1929. In this volume are included all of the papers presented before the convention, as well as the various discussions which took place, giving a complete and comprehensive history of the meetings. The various papers presented have been published in several trade journals, but this is the only volume in which all are collected under one cover and the book makes a convenient reference volume. The price is $2.00

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Space under this heading is available at $4.30 per inch or fraction thereof.

Master Mechanic

25 years' experience on Bucyrus-Erie machines. Can handle any make of machine but prefers a Bucyrus-Erie machine. Can do all his own repair work. Furnish good references. Located in Illinois. Address Box 953, % The Excavating Engineer, South Milwaukee, Wisconsin. 1

Dragline Operator

10 years' experience on Bucyrus-Erie 50-B, 30-B, Class-14 and Class-24 dragline on ditch, levee and construction work. Will work anywhere in the U. S. A. Can do his own repair work and furnish very good reference. At present located in Wisconsin. Address Box 951, % The Excavating Engineer, South Milwaukee, Wisconsin. 1

Shovel Operator

5 years' experience on Insley, Byers Bear Cat, on street excavating and clamshell work. Wants a position in the South or West. Can do all of his own repair work and furnish very good references. At present located in Kansas. Address Box 952, % The Excavating Engineer, South Milwaukee, Wis. 1

Dragline and Shovel Operator

Nine years' experience on Bucyrus-Erie Class 230, 180, 24 and 9½ steam machines, 175-B electric, Diesel 20-B and 30-Bs, and gasoline Class-9½. Can furnish references and can do own repair work. At present located in Louisiana. Address Box 950, % The Excavating Engineer, South Milwaukee, Wisconsin. 1

Dragline Operator

With eleven years' experience on Bucyrus machine on levee and irrigation work. Would like a position anywhere in the United States. Can do his own repair work. Can furnish good reference and at present located in Louisiana. Address Box 954, % The Excavating Engineer, South Milwaukee, Wis. 1

HELP WANTED

Dragline Operators

Single men for positions in Central and South America. Only those with experience in operating Diesel powered draglines need apply. Write fully, stating age and Diesel dragline experience, to: United Fruit Company, One Federal Street, Boston, Massachusetts (Employment Department).

Steam Shovel Engineers

Single men for positions in Central and South America. Prefer those with some experience in operating Diesel powered shovels. Write fully, stating age, and experience in operating steam and Diesel powered shovels, to: United Fruit Company, One Federal Street, Boston, Massachusetts (Employment Department).

Mining Nitrate on the Chilean Pampa

(Continued from Page 387.)

It takes sturdy, well-protected machinery to stand up under the wind-blown grit of these desert operations.

Old Methods of Domestic Production Wasteful

The nitrate industry was formerly a domestic enterprise. Iron pots were filled with pieces of *caliche* from the soil, with a content exceeding fifty per cent, and boiled with water over stones in order to form a saturated solution. This was decanted and then cooled in a flat trough called a *"batea."* The ore treated in this way yielded but half of its nitrate content. The output was not great.

By the new method, low grade *caliche* is used which averages ten per cent nitrate. The improved equipment, and the large quantity handled, makes even this small per cent profitable.

The really proper start of the nitrate industry was made in 1870 by testing various apparatus to find a process for lixiviation. The crude kettle extraction was satisfactory in the past, since small quantities only were used for making black blasting powder to be used in the nearby copper mines, but now with the whole world demanding nitrate for its fertilizer and chemical industries, all but the most modern extraction processes are inadequate.

Memorized

Mrs.: "Dear, I saw the sweetest little hat down town today."

Blurb: "Put it on, and let me see how you look in it."

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BYERS TRUCK CRANE, 25-foot boom, ½-yard narrow digging, Owen bucket. Mounted on a 5-ton Mack truck, in good working condition. Machine 4 years old. Price $2500. Address Box 801, % The Excavating Engineer, South Milwaukee, Wis.

MARION 36 STEAM SHOVEL, caterpillar mounting, 1½-yard dipper, 29-foot boom, 18-foot dipper handle. Priced very low. Location North Dakota. Address Box 616, % The Excavating Engineer, South Milwaukee, Wisconsin.

BUCYRUS CLASS-24 ELECTRIC DRAGLINE, equipped with 100-foot boom, 4-yard bucket, self-propelling equalizing trucks, also skids and rollers. Address Box 212, % The Excavating Engineer, South Milwaukee, Wisconsin.

AUSTIN No. 6 DRAGLINE, caterpillar mounted, 45-foot boom, 1¼-yard bucket, Fairbanks-Morse Type CC Semi-Diesel engine; shop number about 260. This machine is equipped with the Hansen Automatic Dragline Bucket. Located in vicinity of Milwaukee. In excellent condition and priced attractively. Address Box 200, % The Excavating Engineer, South Milwaukee, Wisconsin.

TYPE 3-A THEW, located near Pittsburgh, Kansas. 31-foot boom, 24-foot handle, 1-cubic-yard dipper, caterpillar mounted. Shop number about 2150. Shovel used very little and in very good condition. Equipped with new boiler. For immediate delivery. Address Box 805, % The Excavating Engineer, South Milwaukee, Wisconsin.

CLASS-7 DRAGLINE, No. 3601, has 43-foot boom with 1½-yard bucket, Twin City engine, mounted on cats. Asking $2000.00. Gasoline driven. Located near Paragould, Arkansas. Address Box 605, % The Excavating Engineer, South Milwaukee, Wis.

BUCYRUS 14-B STEAM SHOVEL, shop number 3595, mounted on caterpillars, equipped with 18-foot boom, 12-foot dipper handle, and ⅝-cubic-yard dipper. Located western Illinois. Priced to sell. Address Box 800, % The Excavating Engineer, South Milwaukee, Wisconsin.

TYPE "B" ERIE STEAM SHOVEL, caterpillar mounted, equipped with 19-foot 8-inch boom, 16-foot dipper handle, ¾-yard plate front dipper, power boom hoist, 2-speed propelling mechanism. Shipped new from factory October 1923. Address Box 902, % The Excavating Engineer, South Milwaukee, Wisconsin.

1-T-MONIGHAN WALKING DRAGLINE equipped with 45-foot boom, with 6-foot extension, shop No. 383, about five years old, completely overhauled in 1928 with an expenditure of $4600.00. In excellent condition, located in Arkansas, and ready for inspection. The price f. o. b. cars present location, $6,000.00. Address Box 901, % The Excavating Engineer, South Milwaukee, Wisconsin.

TYPE "B" ERIE HIGH LIFT SHOVEL, No. 3354, 14-foot 6-inch boom, 18-foot dipper stick, ¾-yard manganese front dipper, on caterpillar mounting, in good condition, $3,500.00. Address Box 900, % The Excavating Engineer, South Milwaukee, Wis.

BUCYRUS 70-TON RAILROAD TRACK-TYPE STEAM SHOVEL, with 2½-yard dipper. Prompt shipment can be made and this machine can be inspected at Barth, Mississippi. Address Box 803, % The Excavating Engineer, South Milwaukee, Wisconsin.

O. & S. 7-TON TYPE T MAGNET CRANE, gasoline power, caterpillar-type mounting. 35-foot boom, 39-inch Cutler-Hammer magnet. Also equipped to handle ¾-yard clamshell. Located southern Wisconsin. Can be inspected in operation. Priced very low. Address box 706, % The Excavating Engineer, South Milwaukee, Wisconsin.

TYPE "A" ERIE STEAM SHOVEL, ¾-yard dipper, 16-foot boom and 13-foot dipper handle. Caterpillar type mounting. Completely rebuilt and with same guarantee as new machine. Immediate shipment. Located in Indiana. Address Box 305, % The Excavating Engineer, South Milwaukee, Wisconsin.

MODEL 205 P&H CLAMSHELL MACHINE mounted on semi-cats (that is, caterpillar in rear, wheels in front), equipped with 30-foot clamshell boom and including ½-cubic-yard clamshell bucket. Machine is about 7 years old, but reported in good condition, and the customer handled concrete aggregates last season with this machine in five months sufficient to lay 16 miles of highway. Machine now located near Belvidere, Illinois. Price, $1250. Address Box 804, % The Excavating Engineer, South Milwaukee, Wisconsin.